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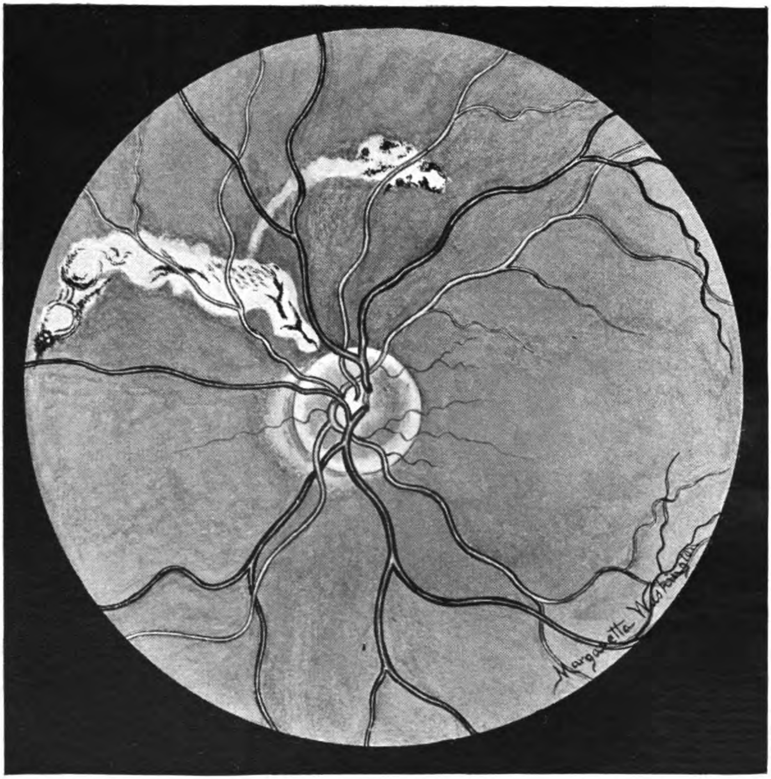

PLATE I.

V-Shaped Rupture of Choroid. de Schweinitz' Article.

THE

PRACTICAL MEDICINE SERIES

OF

YEAR BOOKS

COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

ISSUED MONTHLY

UNDER THE GENERAL EDITORIAL CHARGE OF

GUSTAVUS P. HEAD, M. D.

Professor of Laryngology and Rhinology, Chicago Post-Graduate Medical School

VOLUME III

THE EYE, EAR, NOSE AND THROAT

EDITED BY

CASEY A. WOOD, C. M., M. D.
ALBERT H. ANDREWS, M. D.
T. MELVILLE HARDIE, A. M., M. D.

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The Eye

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THE EYE.

INTRODUCTION.

The Ophthalmic portion of this volume is intended to furnish in abstract an account of recent additions to our knowledge of medicine and surgery in so far as they are related to the eye and its diseases. The Editor has experienced some difficulty in selecting from the great mass of material collected by him from the publications issued during the past eighteen months what would be most likely to prove of value and interest to readers of the series. It was found impossible to present, by any effective process of condensation and in the space at his command, even a short review of *every* meritorious contribution to ophthalmology that has lately appeared, not only in our own tongue but in the French, German, Italian, Spanish, Dutch, Scandinavian and Slavonic languages. For excerpts from publications in the four last named, the Editor is indebted to the Managing Editor of the *Annals of Ophthalmology,* Dr. H. V. Würdemann, and to his efficient corps of collaborators.

In making the selections in question the intention has been not to deal exclusively with matters that interest the specialist only, but to include, for the benefit of the general reader, such subjects as the relations of ophthalmology to extra-ocular diseases.

Casey A. Wood.

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THE EYE.

ANATOMY.

The Weight of the Lens After Extraction. K. Gruenert[1] analyzed twenty-eight cases as follows: the average age of the patients was 65½ years, and the observer finds that the average weight of the twenty-eight lenses was 0.22 gm., less than Vierordt's estimate of 0.26 to 0.29 gm. The lowest weight was 0.093 gm., being that of a hypermature lens, while the heaviest was a dislocated cataract weighing 0.347 gm. He found the average weight of the uncomplicated senile cataract in its unripe condition to be 0.247 gm., while that of the mature was only 0.215 gm. In complicated cases the average weight of the unripe lens was 0.235 gm., while that of the ripe was 0.230 gm. It was found that the average weight of the unripe cataract was 0.239 gm., while that of the ripe lens was 0.218 gm. This agrees with clinical observations and seems to indicate that in the formation of cataract the lens becomes cloudy in consequence of its absorbing the intraocular fluids, so we have an increase in the weight of the lens, but when the cataract is completely ripened it loses in weight by giving up some of its fluid contents. Four luxated lenses weighed very little, their average being only 0.181 gm., or 1½ times lighter than the normal lens. In the myopic eye the average weight was 0.230 gm. and of the hypermetropic lens 0.215 gm.

Rochon-Duvigneaud[2] has made a careful study of the *lacrimal canals* in both the adult and the new-born. In the latter they present a curve with its convexity outward, but

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(1) Centralb. f. prkt. Augenheilk, June, 1900.
(2) Arch. d'Ophtalm., May, 1900.

in the adult they are nearly straight. He does not regard the small valvules as of much importance. He finds that there are probably two chief classes of nasal duct closure; in the first it is impermeable at the lower end of the sac but is open above and below. In the other class the stenosis commences from below and gradually extends upwards, the canal disappearing and giving place to a cord of connective tissue. In the latter instance it would, of course, be impossible to open the canal by means of a probe as a false passage would inevitably result.

The So-Called Dilator Muscle of the Pupil. Frugiuele[1] publishes the results of his own researches on the iris of man and many of the lower animals, and concludes that in the former there are no fibro-cellular muscles except those of the arterial walls and those of the sphincter iridis, which is rudimentary in some animals. The membrane of Brücke or Henle is not muscular, but is an elastic membrane and is probably continuous with the elastic tissues of the choroid. The cellular elements in front of these are fixed; those behind are epithelial elements pertaining to the retinal epithelium. In man the sphincter rests on connective tissue, a thick compact mass which facilitates its function.

G. T. Schoute[2] cites four cases in which the *vortex veins* did not follow the usual rule of piercing the sclera in the neighborhood of the equator. In one case it was noted that in the right eye one of the vortex veins left the eye very close to the optic nerve head. In the second case two anomalous vortices were seen; one collected the blood from the upper nasal quadrant and proceeded in an oblique direction to the margin of the nerve head where it disappeared. The other collected blood from the infero-temporal quadrant and reaching the margin of the nerve head almost opposite the other vein trunk, disappeared almost as abruptly. In the other cases the vortex veins penetrated the globe in the region of the disc.

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(1) Gazzetta Internat. di Med., 1899, I, 2.
(2) Weekblad v. Geneesk, March, 1900.

Normal Variations in the Size of the Blind Spot. H. F. Hansell,[1] after examining Mariotte's spot in thirty-seven eyes of emmetropes, eleven hyperopes and four myopes, finds that the distance from the center of the blind spot to the fixation point is a little longer in the right than in the left eye of emmetropes; in hyperopia the average distance is 3 mm. longer in the left than in the right eye, while the longest and shortest distance is almost the same in each eye. In myopia the cases were so few that the averages may be misleading. In comparing the three varieties of refraction we find that the greatest as well as the shortest distance is found in myopia. The center of the blind spot is, with a few exceptions, below a horizontal line running through the point of fixation. The shape of the blind spot in emmetropia is oval, with the long diameter in the vertical axis. In four of the cases the outlines were circular and in two the long axis was horizontal. This would seem to show that the optic disc is seldom circular, but, in the majority of cases, oval. In emmetropia the long diameter of the blind spot averages 31 mm.; in hyperopia, 34 mm. and in myopia, 38 mm. It will thus be seen that the size of the blind spot is distinctly greater in myopia than in any other state of refraction. Hansell believes that an examination of the size of the blind spot will prove useful in cases of optic neuritis, choked disc and glaucoma as well as in other disturbances of the eye.

Regeneration of the Ciliary Nerves. A. Biette[2] found that a few years after an opticociliary neurectomy had been performed, the eye had again become sensitive. An anatomic examination having been made, he discovered that a regeneration of the ciliary nerves had occurred. New formations can spring from the nerve trunk, he says, and in spite of defective coaptation may penetrate the sclera and lead to irritative symptoms, especially in the ciliary body.

Ganglion Cells of the Iris. N. Androgsky[3] believes that

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(1) Am. Jour. Ophthal., Nov., 1899.
(2) Archiv. f. Ophthal. Bd. 59; Ab. 1.
(3) Arch. of Ophthal. 28, 5.

in the nerves of the iris itself and in the region of the sphincter, ganglion cells are wanting; those described as such are either the nuclei of the nerve fibers or the stroma cells of the iris. Bipolar or multipolar nerve cells are found only in the superficial network of the ciliary processes.

PHYSIOLOGY.

Lucien Howe[1] has given rules and invented an instrument for the exact measurement of the *inter-ocular base line.* He has called attention to two different methods by which it is possible to determine accurately the distance between the centers of the pupils and to study the bearing of this important measurement upon relative accommodation and convergence.

S. S. Golowin,[2] by the use of a peculiarly constructed hydrometer, has succeeded in measuring the *specific gravity of the aqueous humor* in human and other eyes. He finds this to be constant in the eyes of various animals; in the dog, 1.0086; rabbit, 1.0087; cat, 1.0088. The aqueous has approximately the character and gravity of a 1 per cent sodic chlorid solution. In the human animal this may be increased by the endosmosis from a 5 per cent saline solution placed in the conjunctival sac, although, strange to say, injection of the same solution into the subconjunctival tissues does not affect the fluids in the anterior chamber. In acute inflammatory glaucoma the specific gravity is much increased, but the latter is not affected by the changes that occur in the chronic form of the disease.

Tscherning's theory of accommodation is called in question by N. Nicolai.[3] He holds that the surface of the crystalline lens when the capsule is drawn upon has an equal curvature at all points instead of an unequal one as held by the former observer. He believes that the lens during

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(1) Annals of Ophthal., July, 1901.
(2) Graefe's Arch. f. Ophthal., 49, 2.
(3) Ann. d'Oculistique, Aug., 1900.

accommodation becomes thinner, whereas Tscherning holds the opposite opinion.

Movements of the Eye-Ball in Persons Seeing for the First Time. E. Trombetta[1] reports the examination of a patient 10 years of age upon whom the operation for cataract in both eyes was brilliantly successful. The child had neither binocular nor simultaneous vision. It was necessary to develop the faculty of attention, to establish the association between tactile and visual senses, to obtain the gradual substitution of visual for tactile senses and to train the associated movements of the eye-ball. Trombetta succeeded, after the exercise of much patience, in accomplishing this and decided that the education of persons seeing for the first time requires practically the development of the faculty of attention, and the retinal reflex of convergence. One must obtain, first, binocular, and then simultaneous vision. Teach the individual to associate tactile with visual images and, finally, induce a gradual substitution of visual for tactile images.

Forgetting How to See. Th. Axenfeld[2] gives his own observations of a child 6 years old who for one year was blind of acquired cataract and when at the end of that time, by means of a successful operation, he once more began to see, had forgotten how to use his eyes. The writer believes that a child even so short a time blind can be compared with one born blind who has been operated upon, the only difference being that in the former case the patient learns how to see more readily than is usually the case with the congenitally blind. In both cases we have the pronounced disturbances in orientation and the complete lack or loss of visual memory.

Nutrition of the Crystalline Lens. Ovio[3] injected different coloring substances, that were readily absorbed, subcutaneously into the living orbit, vitreous and aqueous humors as well as into freshly enucleated eyes. Studies were also made by directly staining the crystalline. He

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(1) Ann. di Ottalmologia, 1901, p. 17.
(2) Klin. Monat. f. Augenheilk., Beilageheft, 1900.
(3) Ann. d'Oculistique, Aug., 1900.

amount of aqueous may be removed by way of the retinal vessels there can be no question but that the posterior pole of the eye is closed in man, dog, cat and chicken. In the human eye the evacuation of the intraocular fluid takes place through the canal of Schlemm, the perforating veins and the veins of the ciliary body and possibly the vessels of the ciliary processes. They believe also that a small amount of aqueous is evacuated at the root of the iris through the openings that are situated in the anterior surface of this membrane at its extreme periphery. The fluid of the anterior chamber penetrates the iris at its periphery and in the peri-pupillary zone through the stomata described by Fuchs. From this opening it spreads through all the membrane in the interstitial spaces, especially through the posterior layer of the iris and then through the fibrillar tissues that are of more or less loose construction; hence it is absorbed by the vessels of the iris, especially by the veins. From the canal of Schlemm the aqueous finally passes through the veins and capillaries penetrating them by filtration through their walls and in no case through open mouths. It traverses the endothelial lining by insinuating itself into the endothelial interstices. In the advanced stages of glaucoma all the passages by which the aqueous humor escapes from the anterior chamber are more or less closed; sometimes the anterior surface of the iris and even of the ciliary body are capable of absorption, but their powers are always much reduced. In glaucoma, evacuation by way of the optic nerve is practically never established.

Experimental Exophthalmos and Enophthalmus. Walter Edmunds[1] mentions three ways in which exophthalmos can be produced: (1) by acting on the sympathetic, either stimulating it or dividing it; (2) by the administration of certain drugs; (3) by operations on the thyroid gland. Stimulation of the cervical sympathetic produced: (1) prominence of the eye; (2) widening of the palpebral fissure; (3) at first increase and then decrease of intrawe could protect the eye from infection. He also found that a mild iritis lasting for a week or so is conducive to a successful result, probably by increasing the vascular supply in the neighborhood of the lens. In the case of newts, extraction of the lens was followed by its regeneration whether portion of this structure remained or not and he agrees with Wolff that the new tissue is constructed by the action of the iris.

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(1) British Med. Jour., Feb., 1900.

Theory of Accommodation. M. Troncoso[1] presents the theory of Carmona y Valle and compares it with those of Helmholtz and Tscherning; it is that the act of accommodation is accomplished by the compression of the periphery of the crystalline lens through the action of the circular fibers of the ciliary muscle. This compression acts upon the anterior fibers of the zonula, squeezes the soft portion of the lens and crowds it toward the center where it produces a sort of lenticonus. As the lens is supported posteriorly by the vitreous the anterior surface is necessarily mostly affected.

Development of the Lacrimal Passages. Stangulaneau[2] states that in both man and the lower animals the lacrimal canal is first formed by an infolding of the ectoderm situated between the maxillary and the external nasal centers. This is gradually enclosed as a cord of ectodermic cells which extend from the nasal fossa to the lower lid. The upper canaliculus is produced from an outgrowth of the original line of cells. This cord increases in size and length and a central canal soon appears. In the human the lacrimo-nasal ducts and the canaliculi can be distinguished at a very early period.

Excretion from the Eye. Nuel and Benoit,[3] after numerous experiments on animals, conclude that by far the greater part of the aqueous humor is eliminated through the anterior chamber, although in the rabbit a small quantity escapes by way of the optic nerve—following the course of the central vessels. Although it is possible that a minute

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(1) Ann. d'Oculistique, March, 1900.
(2) Arch. d'Ophtal., March, 1900.
(3) Arch. d'Ophtal., April, 1900.

tory of cases of accommodation in lensless eyes, ignores the fact that it is probably the pinhole pupil so often found in cases of secondary cataract (cutting off the diffusion circles) that enables the patient to read in spite of the fact that the normal accommodative apparatus has been destroyed. In Norris and Oliver's Text-Book this matter is fully discussed. The well known experiment of reading print, even with the eye fully under the influence of atropin, through a pinhole in a piece of paper forms an adequate explanation of the accommodation in aphakic eyes.—Ed.]

EXAMINATION OF THE EYE:—INCLUDING OPHTHALMOSCOPY.

Certain portions of the fundus oculi which would be otherwise invisible may be brought into view by pressing upon the sclera, says Trantas,[1] during an ophthalmic examination. Even the *ora serrata* may be easily distinguished. The ciliary processes can be made out by the oblique illumination if the eye-ball is pressed in and the observer places his head as close as possible to the cone of light. By this method the ora may be distinctly seen in all eyes except those of colored people. If the light cone be made to pass through the adjacent parts, the ciliary body may be located by the shadow it casts. By this means, otherwise hidden pathologic changes, such as neoplasms, hemorrhages, peripheral cataract, etc., may be diagnosticated.

The *crossed cylinder* as a means of determining the refraction (after the method of Edward Jackson) is again referred to and commended by T. B. Schneideman.[2] He believes that it is the best subjective means of determining rapidly and with certainty the refractive condition and refers us to Jackson's Manual of Diseases of the Eye, page 184, for a more lengthy description of its use.

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(1) Arch. d'Ophtal., June, 1900.
(2) Ophth. Rec., April, 1900.

A. Pollak[1] believes that we possess a most important means in the measurement of the corneal curvatures that will, in conjunction with the *Bertillon measurements,* enable us to identify the individual years after an original keratometry. In making such examinations, individuals could be classified according to the direction of the principal meridians in each eye, and the amount of astigmatism present. A description of the eye, particularly where one eye differs materially from the fellow, should also be recorded. If there are any marked changes in the fundus, then these should also be noted. In this way a valuable means of identification could be established.

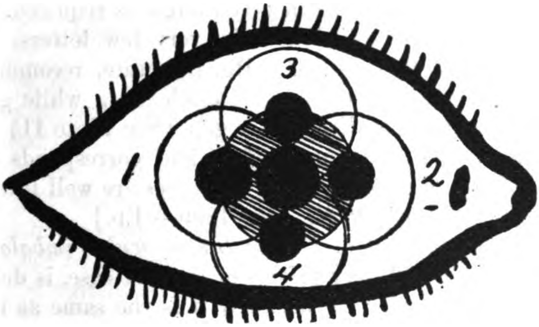

Fig. 1. Diagram to indicate the position of the pupil in:—1, exophoria; 2, esophoria; 3, right hyperphoria; 4, left hyperphoria. [From E. Colburn's Clinical Lectures, p. 113.]

H. Snellen,[2] Sr., proposes his method of *indicating the axes of the eye;*—0° at the vertical meridian and then counting to 90° toward the temporal side and the same toward the nasal side. He claims that this plan shows the symmetry of the eyes and that it is rational, because the strongest refraction happens mostly in the vertical meridian. Since the anatomist divides the body through the median plane in two parts, we may also readily divide the eye along the vertical meridian. He complains that his test-types

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(1) Wiener med. Woch., Sept., 1899.
(2) Ann. of ophthal., Jan., 1901. Dutch abstract.

are not universally employed in the proper way and that his directions for illumination have not been followed. The value of his standard angle has wrongly been taken for the normal visual acuity and many ophthalmologists do not give the denominator as the inventor proposed, but reduce the fraction, or, worse, give the decimal fraction.

Test Types. Landolt[1] believes the test types of Snellen might be improved upon. He says that letters cannot be used for illiterate persons and many people recognize them more easily than others. Furthermore, some letters are more easily made out than are others. The chief objection to them is, that letters as tests do not answer to the definition of the acuteness of vision—the separate perception of two points under a given angle is required. These conditions are complied with by very few letters, for instance, R and B, C and O. He, therefore, recommends a test type consisting of a black circle on a white ground, presenting in some direction a gap (See Plate II) which, for the unit of acuteness of vision, corresponds to the angle of one minute. [These test types are well illustrated in the *Ophthalmic Record* for 1899.—Ed.]

A simple method of *testing the muscular imbalance* by the use of the ordinary prisms of the test case, is described by F. H. Verhoeff.[2] Practically it is the same as used in several phorometers, consisting in the graduation of two ordinary prisms and then using them as revolving prisms. He prescribes a 6 degree and 3 degree prism. The graduations are marked with a glass cutter. This does not harm the prism, which may still be used in the ordinary way. The 6 degree prism is found of sufficient strength for most purposes; when it is not, all that is necessary is to place an additional prism before one of the eyes. The 3 degree is to be used in testing low grades of heterophoria. By reference to the article it will readily be seen how the prisms are marked and how they can be used instead of the Risley or other prisms.

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(1) British Med. Jour., Sept., 1899.
(2) Ophthal. Rec., May, 1900.

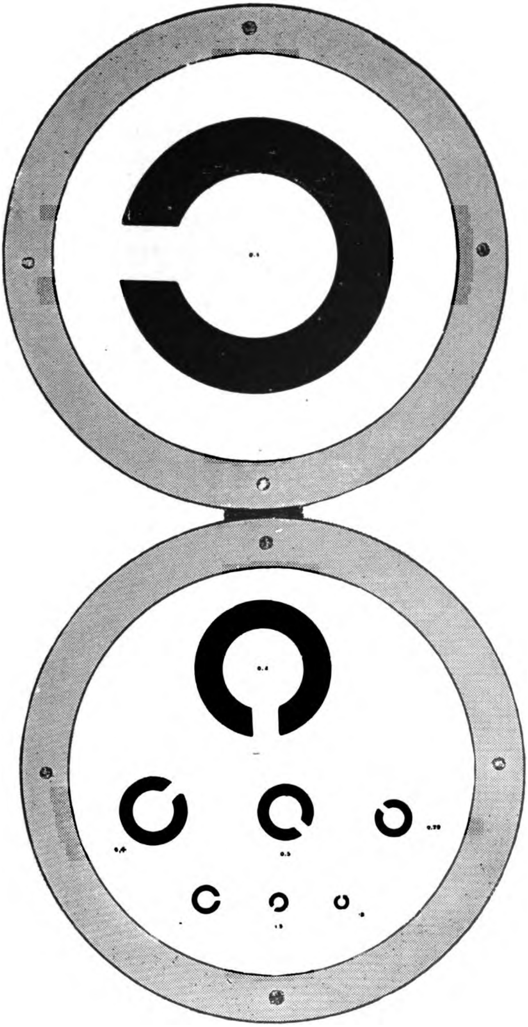

PLATE II.

Landolt's Test Types.

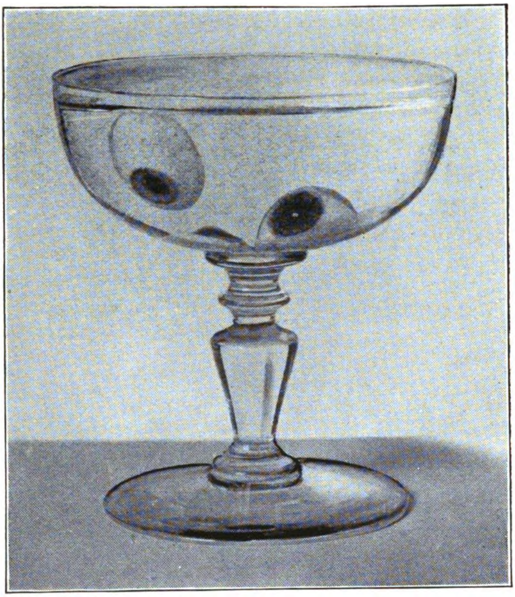

PLATE III.

See Borsch's Article.

The tension of the eye is measured by Nicati[1] with an instrument which he has termed the sclerometer. This is provided with a sort of plunger connected with a hand which revolves around a quadrant on which there is a register. On this scale there are two sets of numbers, from 0 to 100, running in opposite directions. In reading the result the inventor uses one side as a numerator and the other as a denominator. If the hands rest at the zero side of the row, the reading is recorded as 0 divided by 100. The scale is so graded that the weight of one gramme will move the plunger .01 mm.

COLOR SENSE AND COLOR TESTS.

K. Grossman points out a number of defects in the Holmgren wools and prefers the lantern tests. One of these objections is that it is only a daylight test. The variation of the quality of light also restricts its uses. Evil consequences may result, moreover, when there is a certain color scotoma (congenital or acquired); the Holmgren test would declare such an individual color sound, although he would make a dangerous railway employe. Grossman uses an ordinary railway hand-lamp. In front of the bull's eye are placed two metal discs capable of being moved around their centers and perforated near their edges by circular glasses filled with various colors. The colors in each of the discs correspond, but are arranged in different order. On the other side of the disc is a metal plate which overlaps them and is perforated by two holes, one beside the other. Each of these holes is so placed that by rotating the disc on its corresponding side each of the colored glasses is in turn brought between it and the bull's eye of the lantern. "Between the bull's eye and each opening in the plate there is an iris diaphragm, with indicators, showing the diameter of the

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(1) Arch. d'Ophtal., Feb., 1900.

apertures in millimetres. Between the diaphragms and the lamp two slips of glass, suitably mounted, are made to slide up and down. These slips are tinted neutral gray, the intensity being graduated from complete transparency at one end to almost complete opacity at the other. They were first made of neutral-tinted glass, ground wedge-shaped, but the great cost of such wedges led me to make them of graduated neutral gray tint myself at a very trifling cost from ordinary dry plate negatives suitably exposed to light, and developed. These slips are measured photometrically, and indexed accordingly.

"By this means the opening for the light falling through a colored glass can be made to vary in size from 10 mm. diameter to pin point, and in intensity from light to dark. An almost unlimited variety of lights, both colored and "white," can thus be obtained. Both discs can be moved independently, as can also the diaphragms and glass slips.

"I place the instrument on a table, with a mirror in front and fifteen feet distant. I am seated to the right of the apparatus, the examinee to the left. I select one of the colors of the right disc, the iris diaphragm, the tint slip having been suitably adjusted. The examinee is then instructed to turn the left disc so as to find a match for the signal light of the right disc. The colored glasses are partly chosen from the various pairs and sets of confusion colors ("twin colors" and "triplet colors" of my previous tests). There are at present thirty in each disc, but half that number will probably be found sufficient.

"The graduated neutral tint glass slips will be replaced by discs graduated in a similar fashion. These will be easier to fix, and therefore cheaper, than the sliding glass slips. The lamp used hitherto has been the colza oil lamp. Although the flame was kept fairly steady, variations in the intensity of the light could not always be avoided, and in future the source of light will be a standard sperm candle, the unit adopted in all countries for measuring the intensity or quality of any light.

"Advantages of the Instrument.—As already mentioned, I insist upon the matching of colors, and do not ask any question whatever as to their names. That is a point of paramount importance, which I cannot too strongly insist upon in any color examination. If any one should object to having the two colored signal lights side by side simultaneously, the one to be compared with the other, since in practical life, at sea and on a railway, it is a necessity to determine and interpret a single signal, the apparatus can be used in a corresponding manner. Either of the lights can be blocked out by a cover. One cover is removed first, a colored light shown, and the cover let down again. The examinee is then asked to match this signal from the other disc after the cover of his side has been lifted.

"By narrowing the diaphragm we are able to detect the smallest central scotoma, the possibility of which has hitherto been completely neglected in all practical tests. They have not been looked for even in examinations with spectroscopic instruments; not that there need have been any difficulty in detecting them, but because their importance, and even their existence, has not been recognized. The selection of twin-colored signals is a saving of time and adds greatly to the practical utility of the apparatus."

By use of an instrument which he calls the *chromoscope,* M. Knies[1] is able to study to great advantage the color sense. The instrument is a box lined with black velvet. Its front side can be turned down nearly to the horizontal, while on the opposite side above is a small projection on which is mounted a small glass prism at an angle of 60 degrees. A piece of white paper is viewed through the prism, one margin or the other being brought into the field, and the patient is asked to select a skein of yarn similar to the prismatic color projected by the prism on the paper, without calling it by name. Knies believes that there are two sharply differentiated forms of congenital color-blindness: protanopes (red-blind) with a maximum perception in greenish-yellow, and deuteranopes (green-blind) with a

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(1) Arch. of Ophth., Sept., 1900.

maximum perception in orange and blue, and these can be detected with the chromoscope at a glance. The instrument also determines those color anomalies which arise in progressive diseases of the optic nerve and other organs. He has discovered and accurately measured a previously ignored congenital defect—color-blindness for violet.

The inefficiency of the British Board of Trade tests for the detection of *color-blindness* is treated at length by Eldridge-Green.[1] He objects (like Grossman) to the Holmgren tests on the ground that a person with a color scotoma will escape detection. He prefers the classification test and the lantern test, especially the latter. His lantern has thirteen slides, seven of which are colored, by whose use he is able to reproduce the conditions of fog, twilight, etc., under which marine and railway employees are expected to distinguish signals. It readily demonstrates to any onlooker the incompetence of those rejected. Moreover, the light has none of the accessory qualities which enable the color-blind person to escape the other tests, and no amount of coaching will enable him to pass it.

Color Perception in Infants. The young infant, according to Holden and Bosse,[2] chooses the colors at the red end of the spectrum before those of blue. As physical development proceeds and the child becomes more distinguished from the animal, there is an indifference to all colors, while a little later, as a rule, a dislike appears for the exciting reds and yellows and a preference for the less exciting colors of the blue end of the spectrum. These conclusions were reached after a large number of experiments upon infants.

Green Vision. Work Dodd[3] reported the case of a patient who saw everything green and since that time he has collected thirteen published cases of this condition. It was noticed that two cases suffered from migraine, two from syphilitic disease, three from chronic lead poisoning, and ten others had various diseases of the fundus. One re-

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(1) The Lancet, May, 1900.
(2) Arch. of Ophthal., May, 1900.
(3) The Lancet, March, 1900.

sulted from a wound and another from cataract operation; two were the subjects of tobacco amblyopia, while two others had only occasional green vision.

REFRACTION OF THE EYE.—AMETROPIA AND ITS TREATMENT.

Operative Treatment of Myopia. The removal of the lens in high degrees of myopia is considered by C. S. Bull,[1] who presents the following observations: The dangers are intraocular hemorrhage from rupture of a fundus vessel, detachment of the retina, with or without hemorrhage, secondary glaucoma resulting from the swelling of the lens after laceration of the capsule, and infection of the corneal wound, iris or both. The operation is contraindicated by extensive degeneration of the retina and choroid in the region of the macula, detachment of the retina already existing, membranous opacities of the vitreous, which indicate more or less disease of the choroid or blood vessels, previous loss of one eye from whatever cause, any form of contagious conjunctivitis, particularly trachoma, advanced age of the patient and myopia of less than 12 D. Operation is indicated if the central vision of the patient, with the best possible glasses, is not sufficient for his needs or social position; first one eye and then the other should be operated upon.

Treatment of Asthenopia. H. Pagenstecher[2] describes *asthenopia* as a defect in eyes possessing unimpaired vision in either their accommodative, refractive or muscular functions. This condition may also be due to a conjunctival affection or a general neurasthenic condition. He warns us against laying too much stress upon the value of glasses and believes that especially in America and England too much importance is attached to their use. He regards glasses as a last resort in treatment and warns us not to

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(1) Medical News, Jan., 1900.
(2) Zeit. f. Augenheilk, May, 1901.

make our hypermetropes prematurely presbyopic. By the constant use of convex glasses patients lose the power of accommodation for distance and near. He cautions us for the same reason against giving myopes lenses for continued use. He regards muscular asthenopia as rare, and when it does occur it should be corrected by prisms with proper sphericals and cylinders. He advises against tenotomy and refers to a rare form of asthenopia which he believes is due to a slight paresis of the external rectus. This he thinks might be corrected by prisms. Inflammatory conditions of the eyes because of asthenopia are common and these changes are mostly found in the folds of transmission which ought to be treated by the alum or copper stick or mild silver solutions. One condition consists of a red swelling between the folds near the bulbar conjunctiva. The patient complains of discomfort, possibly of burning and irritation about the lids. Often general conditions are responsible for the asthenopia. These are mainly anemic, gouty or neurasthenic. Whenever the supraorbital nerves are sensitive, massage of the eye-ball and the skin around the course of the nerve itself is of value. Forcible and frequent rubbing of the temples and forehead for one or two minutes at a time is of great assistance. He does not believe in electric massage. Most of the diseases peculiar to women, and (among nasal diseases) affections of the accessory cavities, are particularly responsible for asthenopia.

Eye Changes in Myopia. J. Schlesinger[1] discusses 1,000 cases of myopia of at least six diopters, that were observed by him for years at the polyclinic in Breslau. The average age of the patient rises with the degree of myopia, and the percentage of eyes with opacities of the vitreous, grows with the degree of the myopia; the same is true of cataract. Detachment of the retina occurred in 4.4 per cent and except in two cases was unilateral. The average refraction in these cases was 12 D., and the age 43 years, so that the author does not believe that detachment of the retina is mostly met

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(1) Beitr. zur Augenheilk., 45.

with at advanced age and in very high myopia. Disease of the macular region was frequently found in myopes of from 6 to 8 D. On the whole, the statistics prove that ocular alterations frequently occur in myopes of less than 10 D., and he is consequently opposed to the teachings of Tscherning that myopia, in that respect, is not serious as long as it does not exceed 10 D. A large percentage of the cases had a hereditary predisposition to myopia—boys being more disposed to short-sightedness than girls.

Macular Changes in Myopia. Recently Fuchs[1] has drawn attention to a black spot near the fovea in high degrees of myopia, evidenced by defective vision and metamorphopsia. The patient always notices this scotoma in the center of the visual field, which to some appears dark and to others red or green; this may be accompanied by phosphenes and is very alarming to the patient. Vision is sometimes reduced to 1-10 of normal, and the central defect may be absolute. With the ophthalmoscope the characteristic black spot is seen, sometimes larger than a disc diameter. It is usually well defined, very dark in color, but its center may be reddish gray or even white. A similar spot is sometimes noticed in otherwise normal fundi. As a rule, further changes go on and eventually nothing may remain but a circular pigmented line surrounding the fovea or a number of pigmented spots. This zone is the result of absorption of pigment epithelium and is evidence of alterations in the fundus. The spots do not disappear nor does central vision much improve.

Following the method of Bronner, Schulin[2] recommends that a drop of a ½ per cent solution of homatropin be instilled at night into the eyes of such asthenopes as students, bookkeepers and others who are unable to give their eyes the relaxation they need—with the idea of tiding them over a certain length of time until they can obtain the needed rest from work. A few weeks of this treatment is always beneficial, whether it be given in conjunction with

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(1) Zeitsch. f. Augenheilk., March, 1901.
(2) Ann. Ophthalm., Jan., 1901.

other treatment or not. It greatly relieves the eye-strain, operates only during the night and does not disturb the sight in day time.

Operative Changes in the Corneal Astigmatism. The degree of astigmatism and the direction of its chief meridians before and after operation for squint, were observed by M. Auerbach[1] in a number of cases, from a few days up to several months after the operation. The observer concludes that these operations do affect the corneal curves, but he was unable to lay down definite rules by which the character of these changes can be predicted.

Botwinnik[2] believes that the *cornea readily changes its curvature* under slight influences, such as contraction of the orbicularis by blinking, thus bringing pressure to bear upon the the eyeball. This change in the corneal curvature may correct or even over-correct a bulbar astigmatism. Lenticular astigmatism may correct a corneal astigmatism of from ½ to 2½ D.

Carl Schulin finds that in *anisometropia* uncomplicated with a high degree of astigmatism the right eye is generally less hyperopic or more myopic than the left, and he finds this rule holds true in the examination of 2,000 eyes of all ages.

Cyclopegia in Refraction Work. Once more C. M. Culver[3] gives his experiences in the examination of more than 1,000 eyes, and concludes that a 2½ per cent solution of homatropin instilled six times at intervals of five minutes proves a trustworthy cyclopegic in from one to three hours from the time of its first instillation, usually in sixty to ninety minutes. As a rule the protracted use of a 1 per cent solution of the sulphate of atropin is no more effective as a cyclopegic than homatropin. After a series of experiments with *scopolamin and atropin,* W. R. Rogers[4] believes that although as an evanescent cyclopegic scopolamin is of

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(1) Med. Review, May, 1899.
(2) Arch. f. Augenheil., 39, 4.
(3) Ann. of Ophthal., Jan., 1900.
(4) Amer. Jour. of Ophthalm., Aug., 1900.

great value, final reliance must be placed upon atropin for the attainment of the greatest accuracy.

In the hands of Edward Jackson,[1] *homatropin* is found to be a reliable and satisfactory cyclopegic. He believes that it is just as useful in children as in those who have reached the age of 40 years. He prefers the use of the solution to Casey Wood's disks because of the cocain which the latter contain. A small drop is placed on the upper corneal margin every five minutes until four or five drops have been instilled. [The Editor draws attention to what he still believes to be a fact, viz., that cocain greatly aids the cyclopegic action of homatropin, and that if the eyes be closed during their exhibition until the examination is made and the eyelashes are cleansed of the gelatin, no blurring will be produced by the cocain in the disks.]

Auerbach,[2] after a careful examination of eighty-six eyes, concludes that the depth of the anterior chamber, the radii of curvature and the thickness of the lens are subject to great individual variation. There is no strict relation between the refraction of the eye and the single dioptric elements, but in general the myopic eye corresponds to a deeper anterior chamber, a thinner lens and a greater radius of curvature of the posterior surface of the lens. In very myopic cases the lens generally has a smaller radius of curvature on its outer surface, a greater radius of the inner surface and is thinner; so that, on account of the smaller radius of the outer surface and the thinner lens, a higher refractive power results, which is compensated by a greater radius of the inner surface, lowering the total refractive power. Astigmatism of the lens was found in ten cases by Tscherning's ophthalmophakometer.

Again B. L. Dunn[3] draws our attention to the necessity for the *proper centering of lenses.* He frequently finds that glasses are centered for the far point only, and due attention is not given to the fact that the patient reads through the lower part of his glasses.

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(1) Ann. of Ophthal., Jan., 1901.
(2) Thesis, Moscow, 1900.
(3) Arch. of Ophthal., Oct., 1899.

After a trial of various forms of *bifocal glasses,* John Weeks[1] has found that the chief objections made by patients to this otherwise convenient means of combining distance and near lenses in the same frame are overcome by using a "paster" of oval shape which measures 10 mm. in its vertical and 15 mm. in its horizontal diameter. This gives a field, at the reading distance, of 19 cm. in the horizontal and 12.5 cm. in the vertical meridian. If the paster be placed 2 mm. above the lower margin of the distance lens, it allows clear vision below, permits easy ascent and descent of stairs, allows the pavement to be seen, etc. The center of the reading lenses should correspond with their optical centers, the dispersion rays from their edges being minimized by making their margins as thin as possible. See Fig. 2.

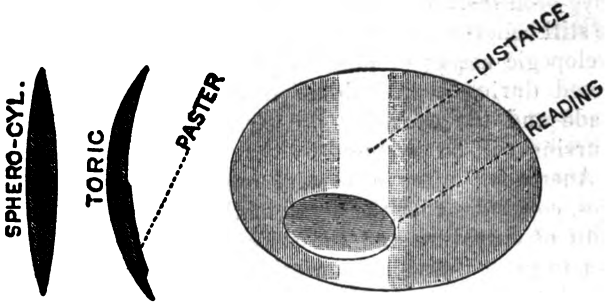

Fig. 2. The Weeks bifocal lenses.

HYGIENE.

Königshofer[2] gives some rules for the *prevention of myopia.* For all near work a distance of at least 25 cm. should be maintained and an oblique position of the head must be avoided. The illumination should be of the best and should not vary in intensity. Near work should never be kept up for a long time and the position of the body

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(1) Med. Record, Aug., 1901.
(2) Woch. f. Ther. u. Hygiene d. Auges, 20, 1901.

should be comfortable. Reading in the cars or in the twilight must be prohibited. School life should not begin until the end of the seventh year, and during the first year not more than eighteen hours a week should be occupied, and study should never be kept up for more than half an hour at a time. For every school hour there should be a pause of half an hour, and there should be a systematic rotation from near to distant work. Even in the highest classes not more than forty-six hours a week should be occupied. These rules are especially applicable to those in whom there is a tendency, hereditary or otherwise, to myopia or to those who already have some myopia. In cases of steadily progressive myopia, work should be decreased to a minimum. He fully corrects all myopia for the distance, but for the near he never corrects in full, but provides the patient with a glass which allows him to work comfortably at from 30 to 40 cm. Where the myopia is less than three diopters he advises the patient to discard glasses for near work. In high grades of myopia he never fully corrects even for the distance, and considers that the greater the myopia the greater must be the uncorrected part of that myopia.

The proper illumination of school rooms and the best method of seating pupils are discussed by C. Zimmermann.[1] He agrees with other authorities in claiming that the main source of illumination should be to the left of the pupil so that the hand casts no shadow on the writing. The glass area of the windows should have at least the proportion of one to five of floor space and the windows should reach to the ceiling. A skylight is very desirable if it can be utilized. Since the best light is obtained from the sky, the surrounding buildings should be so low that a line drawn from the desk farthest from the window to the edge of the lower window sill will pass above their roofs. Windows facing south or east give the most intense light, but if the sun is annoying the writer recommends the use of gray curtains on a pole so fastened

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(1) Am. Med. Jour., Jan., 1901.

that the upper and lower halves may be darkened separately. Artificial light should be a group of incandescents with lightly ground glass, placed in the center of the ceiling with a porcelain reflector above them, or this may be distributed over the remainder of the ceiling and along the cornices. The seating of school children is of importance; the desk and chair should have certain dimensions and relative positions conforming to the size of the child.

Cohn[1] has introduced a *photometer* for testing the illumination of parts of the school-room where the light seems insufficient. This contains many very small figures which must be read at a certain distance through gray glasses. The more figures correctly read aloud within one minute the better is the illumination. He recommends Luxfer prisms in dark school-rooms and notes that gray window shades absorb 90 to 94 per cent of light. He recommends white or cream colored curtains of fine muslin where the illumination is excessive. Burgerstein's opinion is generally accepted that pupils of 7 to 9 years should use their eyes for near work for not more than three to four hours daily; those of 10 to 15 years, six hours; older ones, eight hours. An intermission of fifteen minutes after each lesson should take place.

The children of New Zealand, according to H. L. Ferguson,[2] are peculiarly free from school myopia. Not more than 1 per cent of those who consult the oculist are myopic, and this he thinks is due, not to especially good conditions in the way of light, good print or good desks, but because of a racial immunity from myopia. The largest class of eye troubles are those due to accommodative asthenopia, hyperopia and astigmatism of small degree.

Straub[3] examined 7,000 Dutch school children and found that the number of myopes increased from class to class and from earlier to older age. About 1 per cent or less of myopia was discovered in the lowest class, 4 per cent in the next higher grade, 6 per cent in the next, in-

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(1) Berlin. klin. Woch., 1901.
(2) Austral. Med. Gaz., Sept., 1899.
(3) Weekblad v. Geneesk, June, 1900.

creasing to 8 per cent in the three upper classes and 10 per cent in the highest. This finding, as well known, is in accord with the researches of Cohn and others. In some of the highest grades—grammar and business schools—the near-sightedness rose to 20 and even 25 per cent.

Schulz and Fehr[1] report a number of cases of conjunctival infection caught from frequenting the public baths in Berlin. The latter author now believes that the symptoms were similar to those due to the Koch-Weeks bacillus infection, and that the rapidity with which they yielded to treatment (from four to six weeks) is positive evidence that they did not suffer from true trachoma, as at first supposed.

Simon Snell[2] suggests the following means for *protecting the eyes of employees* in iron and steel works (miners, grinders, chippers and others) who are likely to lose their sight from flying chips, not to mention those exposed to injury from molten metal, sparks, flashes, etc. Large glasses made of plane glass, or the worker's own spectacles of large sized lenses, should his refraction require their use, will afford great protection. A wire-gauze eye-shield also answers the purpose well and it is worth the employer's while to supply his men with them. The use of a pneumatic chipper [air-blower to remove metal particles, emery dust, etc., from machines.—Ed.], whenever practicable, the proper arranging of the men at their work and an arrangement of screens so as to avoid injury to fellow workmen and standers-by, are also considered desirable. Finally, he urges that the use of protectors should be made compulsory.

The *type even in ophthalmic journals,* according to H. Cohn,[3] is particularly bad. Space lines should never be smaller than 3 mm., and there should never be more than twenty-two lines upon 100 mm. of paper. No line should be longer than 100 mm., and there never should be more than fifteen letters on a square cm. He suggests that here-

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(1) Berlin klin. Woch., 1, 1900.
(2) British Med. Jour., Aug., 1899.
(3) Ophthal. Klinik, Jan., 1900.

after *"petit"* type should be banished and that every journal should be printed with deep black letters which should be thicker than they usually are, and, finally, that contributors refuse to send contributions to those journals in which hygienic rules are ignored.

A very elaborate paper on the *economical valuation of vision* is that by H. V. Würdemann,[1] based upon the observations of Magnus. He believes that it is possible to formulate rules by which, considering the earning ability, the amount of damage, the age of the patient, etc., the absolute money value of a partial or total loss of sight may be estimated.

H. F. Hansell[2] has also attempted to fix the amount of injury to the earning capacity of the individual from partial or complete loss of vision. His conclusions differ little from those of Würdemann and are practically as follows: Blindness is that degree of visual loss that incapacitates one from earning his living in some particular occupation requiring use of sight, the degree varying according to the occupation. Vision of less than one-half diminishes the earning power; the less the vision the greater the loss of earning power. Monocular blindness is not incompatible with full earning capacity. Monocular blindness and weak sight rapidly diminish the earning power. The loss of earning power, owing to defective vision, may be computed according to a simple system based upon the ratio of the loss of vision to the full earning capacity at any age and in most occupations.

Vision in Railroad Service. Frank Allport,[3] after an examination of 244 railroads in America, suggests that a scientific and correct entrance examination of the eyes and ears of all candidates for employment in the active operating of trains should be made, and that this examination should be made by regularly appointed eye and ear surgeons. If this is not considered advisable, the company's

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(1) Ann. of Ophthal., April, 1901.
(2) Ann. of Ophthal., Oct., 1901.
(3) Jour. Am. Med. Assoc., Oct., 1900.

surgeon, aided by his assistants, may conduct them, with the understanding that all doubtful cases shall be sent to a regularly appointed eye and ear surgeon. There should be two general standards: first, for new men, and, second, for those men who have been uninterruptedly in service for five years. New men should possess perfect color sense and should have a vision of 20-20 in each eye without glasses and should have healthy eyes with not over two diopters of latent hyperopia. They should also hear the whispered voice at twenty feet in a quiet room and have healthy ears. Old employes should be divided into two classes according to the responsibility involved in their employment. Engineers, firemen and brakemen need good vision and should not be retained in their respective positions if vision sinks below two-thirds in one eye and one-half in the other, or if the whispered voice cannot be heard in a quiet room at fifteen feet by one ear and ten feet by the other. In Class B vision must be at least one-half in one eye and two-fifths in the other, and the whispered voice must be heard at ten feet by both ears. All employes should have perfect color sense. Re-examinations should be made every three years, or after a severe illness or accident, and men should always be examined before promotion. Excessive users of liquor should not receive employment.

C. H. Williams, from the records of the Burlington System, shows that in twelve months after Feb. 1, 1899, there were rejected from those men applying for work, 467 whose acuteness of vision was insufficient, 61 who failed in the color perception examination, and 28 who were defective in hearing. He holds that the proper time to make tests is when men apply for work, and not to discharge them after years of faithful service for a defect which could have been discovered earlier. He prefers the use of both the Holmgren and the lantern test and makes tests with one of the latter constructed by himself. He advises re-examination every three years, and thinks that such examinations should be made when the men are fresh and not when they are fatigued. He notes that the New

York, New Haven & Hartford Railroad is satisfied (for the different grades of employes) with 20-40 in both eyes without glasses.

Despagnet[1] reminds us that at times even subjects of normal vision have difficulty in seeing in the distance on account of fogs or mists; consequently it is wrong to entrust railway trains or engines to any one with less than normal vision. While glasses may correct refractive errors and raise the visual acuity to normal, they are very liable to become soiled and their use should be avoided. All engineers and firemen should have normal color vision as well as normal visual perception without glasses. This is the rule of the Government roads in France, and he finds that it does not interfere with the supply of competent men, as there always is a waiting list of about fifty applicants for each vacancy.

OCULAR BACTERIOLOGY.

An exhaustive paper on the subject of the *relation of conjunctival bacteria to ophthalmic surgery* is presented by P. C. Jameson.[2] In numerous experiments with the various bacteria infecting the sac he concludes that all the pyogenic organisms are found in the normal conjunctival secretion, but usually in an attenuated form. These do not propagate under normal conditions because the eye is well supplied with means of antagonizing bacterial growth. It is only when there is diminished resistance, such as occurs in inflammation or operative interference, that the nature of the secretion is altered and transformed into a favorable medium for germ life. He does not regard the ocular secretions as antiseptic in themselves. Strong antiseptics diminish the resistance of the eye and render it less likely to ward off germ invasion. Much attention should be given to washing out the residual bacteria prior

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(1) Recueil d'Ophtal., August, 1900.
(2) Ann. of Ophthal., Jan., 1901.

to an operation, and care should be taken in regard to asepsis in the external preparation of both patient and operator.

Two cases of pure infection of the conjunctival sac by *pneumococci* were observed by J. Halle;[1] in one of these incubation lasted three days, and in the other one week. Both recovered in a short time with little or no treatment. In a case of tuberculosis of the cornea, Sensberg[2] discovered the *bacilli of Koch.* The patient, a woman, had suffered from lupus of the forehead for a long period of time, but there was no disease of the lungs. The area of ulceration had existed for four days before the author saw it. The treatment was atropin, iodoform, hot applications and aseptic dressing, followed by cure. Bietti[3] observed thirty-four cases of *diplobacillus conjunctivitis* and says the secretion was less during the day than toward the evening hours and it was always found in the morning at the inner canthus. There was very little conjunctival hyperemia which was most marked at the caruncula, but the patient complained of a slight degree of photophobia and inability to use the eyes with artificial light. It is best treated by zinc salts. As a result of a series of studies Petit[4] concludes that the diplobacillus infection, although usually confined to the conjunctiva, may reach the cornea and give rise to an ulcer which is not as grave as most other forms of infection. It occurs at the limbus, is superficial, and does not tend to spread, although if neglected it may extend superficially. The lesion is the direct result of colonization of the diplobacilli which may be found in pure cultures from the secretion of the ulcers. Sulphate of zinc (1:40) has always given the author good results.

The conjunctival sac was examined bacteriologically by Plant[5] in forty instances where the tear sac had been removed. The author shows conclusively that in such cases there is a considerable increase in the number of conjunc-

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(1) Ann. d'Oculist., March, 1900.
(2) La Clin. Ophtal., May, 1900.
(3) Ann. di Ottal., 28—1899.
(4) Ann. d'Oculist., Feb., 1900.
(5) Klin. Monat. f. Augenheil., May, 1901.

tival bacteria, both benign and pathogenic. He does not consider that the germicidal properties of the tears are very marked, and he thinks that their disinfectant qualities have been much exaggerated.

Labanoff[1] noticed in the sound eye a number of so-called non-pathogenic bacteria. He injected into the anterior chamber and sometimes into the vitreous of rabbits bouillon cultures of most of these, but they produced no change whatever. Sarcina lutea, B. subtilis and B. proteus vulgaris produced a plastic iritis. Bacteria that did not set up changes in the anterior chamber produced no change in the vitreous.

Oertzen[2] does not believe with Gasparrini that the *pneumococcus* is frequently found in the human conjunctiva; the latter observed it in 80 per cent of his researches, but Oertzen was able to find it in only 4 per cent of his cases. Nieden[3] discovered in an attack of ophthalmia neonatorum the pseudobacillus of influenza while no gonococci were present. Although the condition proved obstinate, it finally yielded and the child was entirely cured. After an examination of 116 apparently normal eyes, K. Hunsche[4] concludes that demodex folliculorum is not a cause of disease of the lids, and its presence has no pathologic significance. Helleberg[5] believes, after a number of experiments, that the staphylococcus pyogenes is easily killed by tears and that this secretion does exert a decided bactericidal influence and that the effect is not due to the salts but to some volatile substance, destroyed by boiling the lacrimal fluids.

In ninety cases of conjunctivitis Lundsgaard[6] found the gonococcus fifteen times, four of them in infants; the pneumococcus was found fifteen times. In five cases bacteria resembling the pneumococcus were found, but the presence of a capsule was not made out. These cases were

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(1) Messenger of Ophthal., March, 1899.
(2) Klin. Monatsbl. f. Augenheilk., Nov., 1899.
(3) Klin. Monat. f. Augenheilk., March, 1900.
(4) Münch. med. Woch., Nov., 1901.
(5) Hygiene, May, 1901.
(6) Ann. d'Oculist., Oct., 1900.

chronic and the organisms disappeared at the time the disease was cured. No perfectly pure streptococci infection was found. Three times the author found the Weeks bacillus, the cases being non-virulent. The diplobacillus was frequently found, while the diphtheria bacillus was discovered once. A. A. Maklakof[1] describes a lid trouble of many years' standing, associated with thickening of the tarsus and dilation of the duct mouths at the palpebral borders. Bacteriologic examination showed the bacilli of ozena, with which the patient was affected. The author states that this is the first instance where this bacillus has been discovered in the eye. An experimental study by Ollendorf[2] shows that neuroparalytic keratitis is probably an infection from the staphylococcus and that it does not occur when the cornea is protected. He believes that the same process occurs in the human animal that he found experimentally in rabbits and other of the lower animals. He does not agree that the corneal symptoms after a section of the trigeminus have anything to do with vasomotor disturbances, but believes they are really due to bacterial infection.

Ricchi[3] reports bacteriologic researches made in twelve cases of lacrimal tumor and finds that the microörganisms proper to putrefaction predominate, especially the pyogenic bacteria commonly found in abscesses that have direct connection with the external air. In one he found the actinomyces albus; in two others, the saccharomyces. The presence of the former in the contents of lacrimal tumors is more common than is generally supposed. Until recently its presence was connected with that of the so-called dacryoliths, but in this case the actinomyces was not accompanied by any concretions of this kind.

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(1) Arch. f. Augenheilk., 43, 1.
(2) Arch. f. Ophthal., Bd. 49, Ab. 3.
(3) Ann. di Ottalmologia, 1899; 28, 1.

THE EYELIDS.

Bitzos[1] has seen a third eyelid in a man 35 years old. The semilunar folds appeared as a triangular appendage 3 mm. thick at its base and 1 mm. at its apex; it had the appearance of cartilage and presented a smooth, rose-colored surface at the base but was translucent at the summit.

Blepharitis. Galezowski[2] believes that every case of ciliary blepharitis, whatever its origin, depends upon some stricture or obliteration of the lacrimal passages and that most of these cases can be cured by treatment of the cause. Even those associated with granular lids may be relieved by enlarging the puncta and the canal. For this purpose he has devised a syringe made of glass provided with a rubber piston, something like a hypodermic syringe of large size.

Blepharospasm. J. Fejer[3] believes that most cases of functional blepharospasm are hysteric in character; they may give rise to a great deal of suffering and are often difficult to treat. The author in these cases uses sodium bromid internally with the galvanic current locally.

Pes[4] advises surgical interference in obstinate cases of hysteric or other forms of functional *blepharospasm.* He introduces a metallic seton beneath the skin and those fibers of the frontalis muscle which take chief part in the spasmodic contraction. In difficult cases he resects the external nasal ramus of the first branch of the fifth nerve.

Weyman[5] believes that the best method of *performing total ciliectomy* is to make an incision 3 mm. from the free border of the lid and carry it to the canaliculi and outer canthus; this should go as deep as the tarsus. To avoid injury to the eyeball a rubber spatula is used—no tissue

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(1) Ann. d'Oculist., March, 1901.
(2) Recueil d'Ophtal., April, 1901.
(3) Ungarische Med. Press, June, 1901.
(4) Ann. di Ottal., 18-3.
(5) Ophthal. Record, Sept., 1900.

containing hair roots should escape. If little black spots are visible it is a sign that ciliary roots remain and these must be scraped off. A similar lower incision is now made leaving a bridge of skin containing the lashes. This is finally removed, the edges of the wound are brought together and very little scarring results. The relief is certain and lasting. The operation is done under subcutaneous injections of 1 per cent cocain in boric acid solution.

F. Strerath[1] describes several cases of *vaccine blepharitis.* The pustules had in some cases become infected and the scars occasionally involved the cilia. If kept clean these cases do well. They may easily be mistaken for styes, particularly if they are irritated, as in the case of children they are likely to be.

Terson[2] recommends *tarsorrhaphy* in many affections of the eye; he uses it for example in ulcer of the cornea associated with lagophthalmos, in cicatrical ectropion, in certain forms of exophthalmos and in acute ectropion.

Wolffberg[3] in treating those cases of *blinking* which are simply a bad habit and not due to local irritation, suggests that in children, where this symptom seems to give most trouble, the affected eye should be bandaged. He has used this device in many cases with good results.

Rohmer describes a number of cases of the disease called by Fuchs *blepharochalasis;* the clinical history of all of them is about the same. The disease may begin as early as childhood. During a fit of temper while vigorously rubbing the eyelids these become swollen and finally a lobule is forced down until it eventually overhangs the margin of the upper lid. The displaced skin is thickened dermal tissue and consists in part of enlarged arteries and veins. [Hotz probably first described this condition in 1877, many years prior to the report of Fuchs, in connection with the operation upon the lids with which his name is commonly associated.—Ed.]

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(1) Inaug. Diss., Giessen, 1900.
(2) La Clin. Ophtal., July, 1900.
(3) Woch. f. Ther. des Auges, March, 1901.

THE CONJUNCTIVA.

Trachoma. M. Falta[1] strongly recommends *ichthargan* as an application where the silver salts are indicated. In trachoma, when the cornea is involved, the author reports prompt improvement. Pannus he regards as a particular indication for its use. The drug possesses marked germicidal properties and great powers of penetration. Its application is followed by burning which lasts for several minutes and sometimes hours. Children tolerate it better than adults. It is used in from ½ per cent to 3 per cent solutions, and the author claims that fresh cases of trachoma can be cured in from six to eight weeks.

A. Schiele,[2] who lives in a region where 30 per cent of the eye diseases are trachomatous, recommends *iodogallican* in the treatment of the disease. He believes it to be valuable in both superficial and deep infiltrations of the cornea unless there is much ocular irritation; ulcers heal in a very short time. This remedy is a compound of about 40 per cent bismuth and 24 per cent of iodin. He also thinks that iodic acid in the form of sticks is a useful remedy. The trachomatous areas are everywhere touched with this remedy. The pain is severe, but transient, and is followed by drying and discoloration of the parts treated. He also uses a 5 per cent solution with a camel's-hair brush and in pannus has employed it in the form of a salve, which should not be stronger than 1½ per cent and made up with lanolin to which is added a little olive oil.

P. C. Jameson[3] has devised an instrument with which he proposes to attack and disperse the granulations by a sort of superficial grattage. This is a curved arm carrying a plain surface one-third by one-fourth inch in area upon which are numerous rows of small pyramidal projections. The instrument is placed with its operating surface against the trachomatous tissue. Slight pressure being made, the

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(1) Arch. f. Augenheilk., 43-1901.
(2) Centralb. f. prak. Augenheilk., May, 1900.
(3) Ophthal. Rec., Feb., 1901.

apices of the pyramids find their way and insinuate themselves between the bodies of the granules. Forward, backward, or lateral movement at once brings the trachomatous bodies in contact with one of the four cutting edges of the projections; the granulations are thus ruptured and extruded. The author claims that this is done without injury to the normal mucous membrane because the amount of pressure necessary for the instrument to engage and rupture the trachomatous nodules will, if the grater be applied to a normal lid lining, result in its gliding over the surface. M. Falta[1] prefers for local treatment, rubbing in strong solutions of *corrosive sublimate.* If this is not successful he excises the fornix, after a method which closely resembles that of Kuhnt.

T. D. Myers[2] has used *electrolysis in trachoma* granulations for many years and strongly advises its adoption; it is a clean and precise method and may be used in all cases of chronic trachoma where the granulations can be easily picked out. Even a single granulation can be removed from the surface of the epithelium with the least disturbance of its surroundings. The current required is very weak, a battery of 30 ammonia cells; a reliable milliamperemeter with a current of from one to two milliamperes is sufficient. The parts being well cocainized, the effect is indicated by the escape from the sides of the needle of a white pasty mass.

E. Broeckmann[3] believes in *peritomy for pannus,* which he thinks destroys the zone of corneal infection and establishes in its place a band of cicatrical tissue to act as safe bar against further infection. He removes a narrow strip of the conjunctiva near the peripheral border of the pannus. His object is to keep the sclera bare so that a wide zone of granulations may form which will later form a dense, firm cicatrix. This point he considers of great importance and is careful that the conjunctiva does not overlap the wound during movements of the globe.

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(1) Orvosi Hetilap, Oct., 1900.
(2) Ophthal. Rec., Jan., 1900.
(3) Am. Jour. Ophthal., April, 1900.

The eye is dressed daily with some silver preparation. In the second week, the pannus will clear up considerably and at the end of the fourth week the patient may be discharged.

P. Terson[1] again advises the use of *jequirity powder* applied with care to the conjunctiva of both lids and allowed to remain six minutes. This is followed by treatment of the succeeding purulent conjunctivitis, later by the use of glycerol of copper. It is prescribed in all proper cases of trachoma with pannus. He mentions several cases in which after every ordinary treatment of the disease, including brossage, peritomy, and Knapp's forceps, no good results had been obtained. There was complete pannus of both corneæ. Two applications of jequirity twelve days apart, the second one being milder than the first, sufficed to cure the disease. He believes the drug should be limited to old cases of trachoma associated with pannus, where the amount of secretion is slight.

Inouye[2] claims that a certain form of granular conjunctivitis is of luetic origin. The changes closely resemble those seen in the later stages of trachoma, but none of the coincident changes seen in the latter are present, as for instance, there are no scars in the conjunctiva. It corresponds to the second stage of the disease and disappears without any local treatment.

Tuberculosis. J. W. H. Eyre[3] accepts Sattler's classification and believes that conjunctival tuberculosis occurs in about 1:2700 eye cases. The primary disease is usually one-sided, is extremely chronic, does not injure the cornea until late in the disease—the iris still later. The preauricular gland is affected early, followed by the submaxillary glands. If untreated the lesion in the conjunctiva eventually infects distant organs. Removal should be thorough and as early as possible, when a cure may be expected. Where the lesion is a granuloma, tubercle bacilli are rarely found but inoculation of the anterior chamber of a

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(1) Ann. d'Oculist., Nov., 1899.
(2) Ophthal. Klinik, Jan., 1901.
(3) Arch. Ophthalm., Jan., 1900.

rabbit or the subdermal tissue of a guinea pig rarely fails to give positive results.

A. Levy[1] reports a case in which the infection of the eye occurred from the discharge of a cervical abscess. The conjunctival nodules disappeared without treatment, leaving scars. In this the inflammation resembled diphtheria. H. F. Hansell[2] believes that *excision or galvano-cautery* (if the preauricular or other glands are involved) should be included in the methods of treatment of the patches in conjunctival tuberculosis. He believes that inoculations are of great value in the diagnosis, and that the absence of the tubercule bacilli is not of much diagnostic importance.

Ophthalmia Neonatorum. Schmidt-Rimpler[3] believes that careful cleansing of the eye is of prime importance and that in the treatment, clorin water is an agent of great efficiency. Irrigation is the best form of cleansing, using permanganate of potassium in weak lukewarm solutions. Ice cold applications are of most use when the lids are much swollen and should be kept up for two hours at a time. Wolffberg[4] uses for irrigating the eye a very mild solution of *formalin,* which may be further weakened if it produces pain. He generally adds to this borax and a little salt and irrigates every fifteen minutes as long as there is any secretion. The greatest care should be taken not to touch the cornea and conjunctiva and the patient should be kept awake as long as possible after carrying out this treatment. He advises nitrate of silver, 2 per cent, and protargol 20 per cent, as additional applications. The ice-bag is contraindicated but clean ice-water, with two drops of formalin to one hundred grams of water, may be applied on cotton or linen pads.

One hundred cases have been analyzed by Groenouw.[5] These included instances of pronounced blenorrhea as well as simple catarrhal conjunctivitis. The symptoms

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(1) Klin. Monat. f. Augenheilk., May, 1901.
(2) Ann. Ophthal., July, 1901.
(3) Klin.-Therap. Woch., 35, 1901.
(4) Woch. f. Ther. des Auges, June, 1900.
(5) Arch. f. Ophthal., 52-1, 1901.

were produced by various organisms, notably gonococci, pneumococci, streptococci, bacillus coli communis and perhaps also the yellow staphylococci. The blenorrheal cases were generally the result of gonococcus infection, although there were several cases in which none of these germs was discovered. When they were found the blenorrhea lasted longer and ran a severer course than when these organisms were absent. Ulcer of the cornea occurred only where the gonococcus was found. If the gonococci are not found before treatment is begun the prognosis is good; as long as they are present silver salts should be continued. It was impossible to produce a blenorrhea in rabbits either by inoculation with pure cultures or with the pus. The practical result of the writer's experiments is that he did not find protargol superior to silver nitrate.

R. Greeff[1] thinks the bacteriologic examination of the discharges very important. He considers a 2 per cent solution of silver nitrate too strong in the Crede method. 1:4000, he believes, penetrates more deeply into the tissues, does not produce a surface coagulation and does not set up a purulent discharge which may be mistaken for gonorrheal infection, nor does it cause corneal opacities; in any event he would not use more than a ¼ per cent solution of silver nitrate and does not think eversion of the lids and brushing the conjunctiva necessary. The lids are simply held apart and moved about to evacuate the discharge and to bring the anterior parts of the eye in contact with the weak solution which is dropped from a bottle all over the globe. This should be repeated every hour for the first few days and can readily be carried out by the nurse or mother. In the treatment of adult gonorrheal ophthalmia the outcome is not so promising, and yet from one-half to two-thirds of all cases get well when treated by milder solutions while every case of ophthalmia neonatorum recovers when treatment is instantly used.

After many experiments, P. Zweifel[2] found in silver

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(1) Berlin klin. Woch., No. 6, 1901.
(2) Centralb. f. Gynäk., No. 51, 1900.

acetate a better preventive remedy than any of the other silver salts. In his clinic 5,222 children were so treated and of these only 0.23 per cent acquired gonococcus ophthalmia, all recovering without damage to an eye. On the other hand a large number of newborn children previously treated by the usual Crede method gave 0.62 per cent blenorrhea. Protargol was not found to be satisfactory. N. Guerola[1] reports the treatment with protargol and nitrate of silver of a number of these cases. In many of them one eye received a 2½ per cent solution of silver nitrate and the other 50 per cent protargol. He prefers the latter remedy and considers it quite equal to silver nitrate, not forgetting its painlessness, the fact that it forms no precipitate with pus and mucus (and so leaves the eye clearer) and that it does not affect the cornea. He uses it also as a prophylactic in 10 per cent to 15 per cent solutions and prefers it to the harsher silver salts.

F. Schanz[2] has shown that in many cases of *ophthalmia neonatorum* the presence of the gonococcus could not be demonstrated. Of ninety-two instances it was absent in twenty-nine. Widmark found the gonococcus absent in thirty-nine out of 103 cases; Klopstein in fifty-one examples of severe blenorrhea discovered organisms thirty times only. He concludes that a blenorrhea with all the typical symptoms may be set up by the pneumococcus and streptococcus, the Koch-Weeks bacillus, etc.

Chancre. S. Blanca[3] reports a case of *chancre of the bulbar conjunctiva.* This rare infection presented itself as a dirty, yellow ulcer with hard edges, but painless. The patient complained only of roughness on shutting the lid. The preauricular glands were swollen. Proper treatment brought about a complete cure.

Spring Catarrh. Webster Fox[4] believes that grattage of the lids and retrotarsal folds is desirable in *vernal conjunctivitis* and has used it successfully in a number of cases.

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(1) An. de Oftal., Nov., 1900.
(2) Zeitsch. f. Augenheilk., June, 1901.
(3) Arch. de Oftalmol., April, 1901.
(4) Ann. Ophthal., Jan., 1901.

Immediately after scrubbing, the parts are washed with 1:500 sublimate solution. He has never needed to perform the operation more than once upon the same case and thinks that when the operation is thoroughly carried out relapses do not occur. Perret[1] advises the use of *suprarenal extract,* It must be used freely and often. The ocular enlargements eventually disappear and, later, the flat cellular deposits.

Miscellaneous. Ella Wylie[2] reminds us that *Parinaud's conjunctivitis* is characterized by great thickening of the tarsal conjunctiva, and edema of the lids with mucopurulent discharge. After one or two weeks large polypoid granules appear over the tarsi, in the folds or in both. These growths are grayish-red and between them may occur small yellow ones; erosions may be seen between the granulations. The preauricular glands are often involved. Fever and general depression sometimes occur. A spontaneous cure may take place in from two to six months. Little is known of the etiology of this disease except that Parinaud considers it to be a lower-animal infection.

A. Pihl[3] notes two cases of *vaccine conjunctivitis.* There were great swelling and hardness of the lids and, in one case, a distinct vesicle the size of a pea formed on the free border of the lid. The treatment consisted of simple cold applications. S. Stephenson[4] believes that 2 per cent of cases of ophthalmia in children are *diphtheritic,* if all cases of membrane of the conjunctiva are included. He recommends injections of anti-toxin in all suspected cases without waiting for the result of a bacteriologic investigation. Locally a 15 per cent solution of potassic permanganate is to be painted on the conjunctiva and a weak solution of sublimate used for cleansing and irrigation.

H. F. Hansell[5] notes a case of *bleeding from the conjunctiva* in an infant. Death followed from anemia. The

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(1) Ophthal. Klinik, March, 1901.
(2) Ophthal. Rec., June, 1901.
(3) Klin. Monat. f. Augenheilk., July, 1900.
(4) Lancet, Feb., 1900.
(5) Ophthal. Rec., Feb., 1901.

original diagnosis was marasmus. The bleeding began a few days after birth and continued with occasional interruptions in spite of all treatment. Abbott published notes of a similar case in the January (1899) *Annals of Ophthalmology.*

Michel[1] advises borated vaselin with a little cocain in the treatment of *pemphigus of the conjunctiva,* but he thinks the prognosis is generally unfavorable. We do not know the origin of chronic pemphigus but when it does occur on the conjunctiva it is also prone to affect the mucous membrane of the mouth, nose, and pharynx. On the conjunctiva the vesicles usually appear at two points, the inner lid angle behind either of the puncti or at the lower half of the scleral conjunctiva. Almost invariably they are followed by scars.

M. F. Weyman[2] advises the removal of all *pterygia* and has devised an operation whereby relapses are prevented. Post-operative reaction is very mild while perfect covering of the denuded area (which he properly regards as a desideratum in this operation) is brought about.

THE LACRIMAL APPARATUS.

Albrand[3] believes that although probing and such permanent devices as that of Vulpius occasionally yield ideal results; in chronic processes with more or less mucopurulent secretion, in fistula, affections of the periosteum and caries, after burns or other injuries of the inner canthus, in ulcerations of the lid from long standing diseases and in the sequelæ of trachoma it is better to remove the lacrimal sac.

Rollet[4] believes that in abscesses that have no direct communication with the lacrimal sac the successful treatment is incision and curetting. Pressure upon such tumors

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(1) Zeitschr. f. Augenheilk., June, 1900.
(2) Ann. of Ophthal., July, 1900.
(3) Deutsche med. Woch., 1901.
(4) Ann. d'Oculist., May, 1900.

shows no appearance of pus at the puncta; on the other hand chronic purulent tumors of the sac are best treated by extirpation of the latter. Terson[1] says that in *laying open the tear-sac* the incision in the skin should be made directly downward, not more than 4 mm., and not less than 3 mm. from the inner angle of the lid. The region of the sac will then be reached in every case with certainty.

It should not be forgotten, as Antonelli[2] points out, that ethmoid disease and affections of the frontal sinus may result from an orbital cellulitis set up in the first instance by dacryocystitis and he gives an account of such a case. An operation upon the frontal and the ethmoid sinuses was performed and at the end of two months the lacrimal disease disappeared and the patient left the hospital cured.

Krefeld[3] believes that *obliteration of the tear-sac* is a more suitable operation than extirpation. He slits up both canaliculi, and all strictures at the sac entrance are cut through. He then cauterizes the cavity with Vienna paste, moulded into a little ball, wrapped in a thin layer of cotton and introduced to the bottom of the sac. This is removed in two minutes and the sac cleansed and packed with cotton. The eye is protected with vaselin and by having the patient rotate the globe outward. B. Schwartz[4] concludes that *extirpation of the tear-sac* leads eventually to disappearance of the epiphora in many cases of lacrimal duct obstructions. The reason is the compensatory atrophy of the corresponding lacrimal gland. Experiments upon lower animals lead the author to believe that there is some connection between these two organs.

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E. A. Pond[5] describes a modification of the ancient device of *draining the tear-sac into the nose.* A silver probe armed with a coarse silk thread is passed through the canal into the nose where one end of the thread is seized with a pair of forceps and drawn out through the nostril. The probe is then withdrawn, unthreaded and the string left

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(1) Ophthal. Klinik, March, 1900.
(2) La Clin. Ophtal., March, 1900.
(3) Klin. Monatsb. f. Augenheilk., April, 1901.
(4) Zeitsch. f. Augenheilk., May, 1901.
(5) Medical Record, Feb., 1901.

in position with the ends tied together. This is drawn through the nose two or three times a day, a large knot (formed where the ends are tied) serving to keep the opening free. It is not found necessary to slit up the canaliculus. The operation may be done under cocain and the subsequent pulling on the thread does not set up any irritation. The drainage is satisfactory in almost all cases. Sgrosso,[1] in various diseases of the sac and nasal duct, attempts to preserve the former and drain the eye into the latter thus curing the original infection. He incises the anterior wall of the sac, then scrapes it with DeWecker's knife and subsequently opens the duct into the nose. Where necessary a portion of the sac wall is excised to reduce it to the normal size. If necessary a permanent drain is placed in the sac, sutures unite the lips of the opening and a pressure bandage is applied over all.

Lagrange[2] remarks that in *electrolysis of the lacrimal canal* a sound should be used that is protected through most of its length, with an exposed conductor at its end. It is passed through the canal and the current slowly turned on. A wad of cotton is fastened to the negative pole and placed in the patient's nose on the same side as the sound. Five ma. are usually sufficient, turned on for five minutes. The canal should be cleansed with antiseptics before and after the removal of the sound. One application may be sufficient but it is usually necessary to repeat the application several times. DuGourlay[3] speaks enthusiastically of the use of electrolysis in nasal duct stenosis. Of sixty cases fifty were of long standing and were cured, three were relieved, four had slight lacrimation in the open air and three were not cured as long as they were under the author's observation. He uses the constant current in cases of stricture and dilation of the sac, and believes that even in the catarrhal form the secretion is very soon stopped by the action of the galvanism. He

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(1) Ann. di Ottalmol., 29, 1900.
(2) Ann. d'Oculist., Dec., 1900.
(3) Ann. d'Oculist., May, 1900.

also uses the induced current in the same way as a muscular stimulant.

Sourdilles[1] points out that although *abscess of the lacrimal gland* is rare there is reason to believe that such cases are often overlooked. It is usually seen in infancy, the onset is acute and the disease may usually be traced to mumps or measles. The eyelid swells and becomes violet in tint, fluctuations usually appear and an abscess points in the superior cul-de-sac, breaking spontaneously if left alone. There is little systemic disturbance and the patient soon recovers.

Steinitz[2] treats suppuration within the sac and nasal duct with medicated bougies after the manner recommended by Holtz and others. These rods are 3 mm. long and 1 mm. thick, made of cocoa butter to which 5 per cent of protargol or other antiseptic is added. A silver tube is introduced into the canaliculus and sac and through this the rod is forced with a small sound.

Natanson[3] has reported a case of purulent inflammation of an infant's eyes caused by congenital stenosis of the nasal duct. Protargol cured one eye in ten days and daily cleansing of the tear-sac and the use of protargol effected a cure of the other eye in four weeks. On the other hand G. Fejer[4] has not seen any good results following the use of protargol in blennorrhea of the sac and is not much in favor of the use of probes. Where ordinary means fail to bring about relief in a few months, *extirpation of the sac* is advised, and if this is not sufficient, removal also of the lacrimal gland, as Abadie and C. R. Holmes advise. D. Gunn,[5] speaking of *lacrimal obstructions in children,* says that there are cases in which after the canaliculus has been opened, probing reveals a cavity much larger than the lacrimal duct whose position it occupies, filled with an excessive amount of muco-pus. This cavity represents a dilated duct, the dilation caused in early life by an obstruction

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(1) Arch. d'Ophtal., August, 1900.
(2) Klin. Monatsbl. f. Augen., May, 1900.
(3) Med. Review, April, 1900.
(4) Gyogyaszat, Aug., 1900.
(5) Ophthal. Rev., Feb., 1900.

of the lower end, whether this obstruction be congenital or acquired.

Of all the curious *foreign bodies* found in the nasal duct during the past two years, none is more curious than the gnat described by Wolffberg,[1] who found it in a woman with lacrimal fistula. After operation a profuse discharge still continued from the nasal duct and one day there appeared a black-looking object that proved to be an insect 8 mm. long, with short wings and black and white stripes around its body. The case then progressed favorably to cure. The author believes the gnat ascended into the duct from the nose.

Actinomycosis of the canaliculi appears, says Terson,[2] in a much milder form than in any other part of the body. The symptoms in the cases reported by him are epiphora, dilation of the puncta, slight mucous discharge from the sac on pressure and a swelling in the region of the canal. On opening this tumor, ovoid masses varying in color from white to yellow, were removed and the patient soon got well.

F. Buller and W. G. Byers[3] note the extirpation of a *carcinoma of the lacrimal gland* by Krönlein's method. There remained a slight convergent strabismus with limitation of the outward excursion. The patient was discharged in two weeks. He complained of no pain, was well nourished but very anemic. There was slight ptosis of the upper lid; the veins of the conjunctiva were full and tortuous, there was marked exophthalmos and a downward and forward displacement of the globe just below the outer third of the upper margin of the orbit, between it and the eyeball. The tumor formed a dense elastic mass with nodular margins.

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(1) Woch. f. Ther. des Auges, 39-1900.
(2) La Clinique Ophtal., April, 1901.
(3) Montreal Med. Journ., Oct., 1900.

SCLERA AND CORNEA.

Scleritis. E. Jameson[1] does not believe in general medication in these affections and believes that subconjunctival injections of a 2 per cent solution of sodic salicylate, massage of the upper lid with 10 per cent ichthyol ointment, and the superficial cautery are the best remedies. He makes a ring of dotted cauterizations about the margin of the elevated infiltration. W. Stoltzing[2] believes that potassium iodid is the most valuable remedy we possess in fugitive, periodic attacks of episcleritis as an associate of trigeminus neuralgia.

Keratitis. Speaking of *parenchymatous keratitis,* E. Gutmann[3] believes that the treatment with mercury (except perhaps in small children) is useless and harmful. Atropin should not be used where the cornea alone is affected and local irritants should not be employed during the inflammatory stage. The systematic use of cocain is of great value; it lessens the irritation and apparently has a good effect upon the corneal disease. Tonics, arsenic and cod-liver oil especially, are nearly always of value. Haab[4] observed seven cases of *lattice-like keratitis.* At first the changes in the cornea resemble interstitial keratitis; there is a little congestion, photophobia and lacrimation. With a strong lens the changes appear to consist of a very fine clouding of the cornea arranged in interlacing lines. By stronger light they seem dark and may be confused with the vessels of an old interstitial keratitis. The epithelium is roughened and indurated. Occasionally ulcers form. The majority of cases are of the malignant variety and get worse in spite of all treatment. The etiology is obscure and the prognosis very doubtful. Dimmer has also reported instances. The most effective treatment seems to be the yellow salve ointment.

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(1) Arch. d'Ophtal., Aug., 1900.
(2) Münch. med. Woch., Feb., 1900.
(3) Wein. klin. Rundsch., Feb., 1900.
(4) Zeitschr. f. Augenheilk., 2-3, 1901.

S. Stephenson,[1] after the examination of a large number of children with *phlyctenules* of the eye, finds that 53 per cent have, or have had, eczema, thus confirming the statement of Horner, that the two diseases are one and the same. He also believes that phlyctenular keratitis goes hand in hand with the tuberculous or scrofulous diathesis, and observes that these diseases were found in nearly 32 per cent of the large number of cases observed by him.

G. F. Suker[2] believes that *keratitis petrificans* is the proper name for *ribband-like keratitis.* He finds an analogy between the calcareous deposits in the cornea and the conjunctivitis petrificans of Leber.

E. S. Thompson[3] described a case of *vesicular keratitis after cataract extraction* resembling that noted by Fuchs. There were no irritative symptoms and no anesthesia of the cornea, although the vesicles were well marked and remained for twelve days. The writer thinks that the increased tension present before the formation of the vesicles was their probable cause.

In *acquired lues* J. D. Lawford[4] asserts that interstitial keratitis may be present and cites a number of instances in proof. He draws attention to certain differences between the acquired and the inherited variety. In the former the attacks are of shorter duration and less severe and often only one eye is affected. The prognosis is also better and there is a more complete restoration of the transparency of the affected cornea.

F. Mendel[5] also describes a patient whose mother was luetic and who, in his twenty-second year, had acquired specific disease. Both eyes became affected with a *typical diffuse keratitis* that disappeared under energetic inunction. Six years later it recurred under the guise of an episcleritis, which also disappeared under inunctions.

G. Gentilini[6] has observed three new cases of *aspergillus*

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(1) Med. Press, Oct., 1900.
(2) Ophthal. Rec., Nov., 1900.
(3) Ann. of Ophthal., April, 1900.
(4) British Med. Journ., Oct., 1899.
(5) Centralb. f. prak. Augenheilk., Jan., 1901.
(6) Beitr. z. Augenheilk., 45, 1901.

keratitis in addition to those already recorded by Leber and Uhthoff. In all, the aspergillus fumigatus was found, having apparently entered the cornea after injury. The ulcers were dry, whitish, and with a rough surface projecting above the surrounding cornea. The treatment was atropin, scraping and cauterization of the focus, and, when painful, hot applications. It is characteristic of this affection that the opacity, about the ordinary ulcer, in this case was separated about 1 mm. from it, so that the ulcer is surrounded by a ring of transparent cornea 1 mm. wide.

D. Basco[1] reports a case of *keratomycosis* due to the aspergillus fumigatus in which the cautery loop was successfully applied to the ulcerated space. A cure took place in three months. Markow[2] reports in a man of 50 a large opacity of the left cornea, over which a fungus of loose, gelatinous, yellowish appearance was growing. The anterior chamber was obliterated. Microscopic examination showed this mass to be of the aspergillus fumigatus.

Ulcer of the Cornea. H. Friedenwald[3] advises, in the treatment of *dendritic keratitis* and superficial *rodent ulcer,* the ordinary tincture of iodin, and prefers it to all other remedies. He applies it soaked in absorbent cotton firmly wound around a wooden toothpick, the eye being first prepared with fluorescein and cocain. The application must be made as thoroughly as possible and should involve both the ulcer and its immediate neighborhood. If applied in this way one application is usually sufficient. A bandage with simple ointment should be used for a day or two.

A. Deutsch[4] gives a complete analysis of all the cases of *serpent ulcer* seen in the Geneva Eye Clinic for 1898 and 1899. He confirms the observation of Uhthoff that in the majority of cases pneumococci are the cause of the disease.

Reuss[5] speaks of an apparently trifling but in reality an important lesion of the cornea, namely, *erosion* commonly produced by a finger-nail scratch. The diagnosis is not

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(1) Ann. di Ottal., 29, 1900.
(2) Messeng. of Ophthal., April, 1900.
(3) Am. Jour. Ophthal., July, 1900.
(4) Ophthal. Klinik, Oct., 1900.
(5) Centralb. f. prak. Augenheilk., April, 1901.

always easy because fluorescein may reveal no break in the corneal epithelium. The author attributes it to a loosening or a separation of the union between the cornea and epithelium. The patient suddenly awakes with decided pain in the eye and in spite of all treatment the pain may continue for weeks and even months. In spite of treatment and after temporary improvement, the story of pain on awakening in the morning is continued. Where the diagnosis is made and the region of the lesion discovered the epithelium should be removed and allowed to reform; in this way complete healing may be obtained and with it disappearance of the symptoms. A pressure bandage with boric ointment seems to be the best local application.

Keratoconus. H. Knapp[1] says of the galvano-cautery in conical cornea, that we should never cauterize too deeply. If the result of the first operation is imperfect, apply the convex disc-electrode again to the place where one desires the cicatrix to have the greatest effect. Spare, if possible, at least one-half the pupillary area. If one operates early and confines the operation to the progressive cases, one has to deal with a clear cornea, reaction will be least and the visual results as well as the operative effects greatest. On the other hand, R. Sattler[2] advises caution in employing surgical interference as he believes it is attended by uncertainty and danger, even in the most favorable cases. It is always tedious; of all the surgical means he believes the galvano-cautery the best supplement to iridectomy or iridotomy. In desperate cases the lens may be removed, followed by tattooing or superficial cauterization of the conic apex.

Sgrosso[3] again advises the use of the galvano-cautery in keratoconos, after the rules laid down by Meyer. He believes that a solid cicatrix should be formed capable of resisting intraocular pressure. The cautery point should be applied to the temporal wall of the cone and unless the latter be very small it is not recommended to cauterize the

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(1) Jour. Am. Med. Assoc., Aug., 1900.
(2) Jour. Am. Med. Assoc., Aug., 1900.
(3) Ann. di Ottal., 18-3, 1900.

apex. The burning should be as deep and as extensive as possible.

S. M. Burnett[1] does not attach much value (in the non-operative treatment) to the hyperbolic lenses of Raehlmann and thinks that the contact lenses of Hershell are too hazardous for practice. The stenopeic slit is of some considerable value. He believes that the ophthalmometer is our best means of estimating the amount and kind of refractive error present in the corneal cone.

Miscellaneous. Krantchenko[2] believes that an aqueous extract of cloves increases the visual acuity through a clearing and eventual disappearance of *corneal opacities.* The more recent the affection the better the result; it should not be applied when acute inflammation is present and it is useful in deep as well as superficial nebulæ. A single prolonged application of the extract does not produce unpleasant effects. Where the opacities are superficial and diffuse the extract should be used twice a day and repeated at intervals of from five to ten minutes. In maculæ this treatment should be combined with touching the affected parts with the fresh solution; cocain may be used to relieve pain. The patient notices improvement in from one to two weeks. The extract is made by grinding the cloves to a coarse powder in a coffee-mill. This is mixed with fifteen times its weight of water and again ground in a small mortar. The filtered fluid is used as above.

To prevent *sunburn of the cornea,* which is the most serious complication of snow blindness, S. Mitchell[3] tells us that the Indians of Alaska wear wooden goggles with a shelf-like projection above them, so that the eye is preserved from the effects both of the direct and indirect rays of light. Takayasu[4] believes, after much investigation of the subject of *arcus senilis,* that it is nothing more than a fatty degeneration of the corneal substance and that the granules found in the degenerated area are fat granules.

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(1) Annals of Ophthal., October, 1900.
(2) Arch. d'Ophtal., Dec., 1900.
(3) Ophthal. Rec., March, 1900.
(4) Arch. f. Augenheilk., 42-2.

THE LENS. CATARACT.

Recently K. Baas and R. L. Randolph[1] have written on the *regeneration of the lens.* The former relates a case in which a cyst-like growth sprang into view after a cataract extraction. He thinks that this bears some relation to the well-known fact that certain of the lower animals grow new lenses when the old one has been destroyed or removed, and suggests the name of Lentoma for the growth in his case.

G. E. de Schweinitz[2] divides *immature cataracts* into three classes: non-progressive cortical opacities; progressive cortical opacities; nuclear and mixed opacities, and believes that all of them should be regarded as indications for a thorough investigation of the patient both from the general and the ocular standpoint.

W. L. Pyle[3] classifies cases of *spontaneous disappearance of senile cataract* under the following heads: (1) those where there was absorption after spontaneous rupture of the anterior or posterior capsules; (2) where there was spontaneous dislocation of the opaque lens; (3) where intracapsular absorption of the opaque cortex took place and the nucleus sank below the axis of vision; (4) in Morgagnian cataract without rupture of the capsule or dislocation of the crystalline; (5) cases where there was spontaneous absorption of both the cortex and the nucleus without any evidence of rupture of the capsule; (6) dislocation or Morgagnian degeneration of the lens; (7) cases of spontaneous disappearance of the opacities without changes in the lens substance or difference in the refraction. [The Editor has now under observation a lady aged 61, who for thirty years has been blind from mature cataract in both eyes. V-fingers at a few inches. Two sisters and one brother had also acquired cataract and were operated on without success, *i. e.*, the eyes were lost from iridocyclitis.

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(1) Münch. med. Woch., Nov., 1899.
(2) Jour. Am. Med. Assoc., Dec., 1900.
(3) Phil. Med. Jour., March, 1900.

Owing to the unfortunate experience of her relatives she declined operation. Six months ago the left eye began to recover its sight, and when last examined V = 15/200. A clear area, about 2 mm. square, could be plainly seen in the outer lower segment of the lens. There was no evidence of diabetes or other general disease. Trousseau[1] gives an account of absorption of the lens in a patient 55 years of age. Several months were occupied in the process, which is now nearly complete, leaving only a small membrane covering a small portion of the pupil. With a correcting lens the patient has 2/3 of normal vision.]

Widmark[2] advises extraction in persons over 50 years of age as soon as sight becomes noticeably impaired, and does not believe that it is necessary for obtaining good visual results to wait until the so-called senile cataract is entirely ripe.

F. Mendel[3] regards the technic of cataract removal in persons with only one eye (having lost the other eye through a previous operation) as exceedingly important. In Hirschberg's clinic a thorough aseptic preparation is considered the chief consideration for success. The lacrimal passages, a common source of infection, are carefully examined and if any inflammatory condition exist it is thoroughly treated. The nasal passages are also rendered aseptic a long time before the operation is advised. In the same way the lids are thoroughly prepared and the operation done under general anesthesia as a rule. Preliminary iridectomy is made and the operation for cataract undertaken three weeks later.

Terson[4] believes that secondary cataract is principally formed from the anterior capsule and believes that its removal during extraction will prevent the necessity for a second operation in a large number of cases. Moreover, primary removal of the capsule (thus doing one operation instead of two) allows the aqueous humor to circulate

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(1) Ann. d'Oculist., March, 1901.
(2) Centralb. f. prak. Augenheilk. Supplement, 1899.
(3) Berliner klin. Woch., June, 1900.
(4) Ann. d'Oculist., Oct., 1900.

freely through the anterior and posterior chambers, lessening the danger of post-operative complications. [Couper and others have for years advised primary capsulectomy; in immature cataract it would seem to be the proper operation.—ED.]

Del Toro[1] believes that many cases of cataract arise from peripheral adhesion of the iris to the lens, interfering with the nutrition of the latter. In these cases he uses Critchet's knife or does a large iridectomy, introduces a discission needle and separates the adhesions by passing it beneath the iris and the lens.

P. Dunn,[2] instead of waiting for the long, tedious absorption of *soft cataract* after discission, administers chloroform to the child, and, using a broad cataract needle, passes it into the anterior chamber of the thoroughly atropinized eye and, after making a vertical and horizontal incision in the capsule, freely breaks up the lens. The needle is turned on its axis at this point so as to allow all the aqueous to escape slowly from the eye. The parts are then thoroughly douched with 1:4000 chinosol, atropin is again instilled and a pad of chinosol gauze is applied. There is little or no reaction. In a few days the pupil is quite black and all that is left of the lens is a small quantity of soft matter lying in the anterior chamber, and in about two weeks there is merely a trace of the cataract.

Pagenstecher has recently operated for *cataract extraction* both with and without iridectomy; the former where the iris showed a disposition to prolapse; in all other cases the simple extraction. He treats his cases with pure ichthyol spread over the lids; this is covered with gauze saturated with liquid paraffin and on top of all a piece of cotton. The bandage is kept in place by a wire shield in spectacle frames. The ichthyol is removed in from twenty-four to forty-eight hours and is not replaced except in cases of irritation. Patients wear the shield for two weeks.

Androgsky[3] favors the Williams-Kalt method of stitch-

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(1) Anales Med. Gadit., Sept., 1900.
(2) Lancet, Dec., 1900.
(3) Mess. of Ophthal., June, 1899.

ing the corneal flap after cataract extraction. The thread is first passed through the corneal tissue without penetrating the anterior chamber. Extraction is then done in the usual manner, after which the thread is tied. He believes the operation to be especially indicated where escape of the vitreous is probable and in simple extraction where one is likely to have prolapse of the iris. In this last case two stitches should be used. He also advises it if there be gaping or deferred healing of the wound, and, finally, in operations for keratoconous and keratoglobus.

Vacher[1] reports further successful cases of cataract removal by the *scleroconjunctival-bridge method.* He claims that the advantages are the impossibility of reversal of the flap, the rarity of hernia of the iris, the early removal of the dressing, no necessity for bandaging the other eye and a small amount of postoperative astigmatism. It may be remembered that the incision is made at the sclerocorneal junction, including, as the knife is withdrawn, a scleroconjunctival flap. The disadvantage is the conjunctival hemorrhage, which appears in about half the cases; the method also requires a more delicate technic than the ordinary extraction.

Therien[2] regards simple extraction as the ideal operation, but says there are many indications for the employment of the combined method. Whenever the capsule is involved with the lens, iridectomy should always be done, and he regards hernia of the iris as due to a neglect of this preliminary precaution.

S. Fernandez[3] is convinced that the after effects of an operation are more satisfactory when iridectomy is done; if the incision is far enough within the cornea to prevent prolapse it interferes with vision. He cites three cases of simple extraction where the immediate result was very good, but in which adhesion or prolapse formed

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(1) La Clin. Ophtal., Nov., 1900.
(2) Arch. d'Ophthal., April, 1901.
(3) Anales de Oftal., Jan., 1901.

later, inclining him to wish that he had resorted to immediate iridectomy.

Capt. Henry Smith[1] reports 1,804 *extractions of cataract in the capsule* and claims the operation to be as simple as any other. It leaves nothing behind to become opaque, no foreign matter to set up iritis, no instruments are inserted after delivery of the lens, but, it may be added, he admits, that there is a greater liability to escape of vitreous. He removes the speculum as soon as the incision is made, and to further prevent vitreous loss an assistant holds the upper lid with a blunt hook and the lower lid down with the thumb. In a small percentage of cases no iridectomy was done. In a few others an iridectomy formed part of the operation. He does not insert the loop behind the posterior capsule and scoop the lens mass out in the ordinary way, but having gently squeezed out as much of the cataract as will come by pressure and counterpressure he afterwards extracts the capsule and the lens matter it contains with an ordinary dressing forceps.

W. H. Wilder[2] reports the successful extraction of two *congenitally dislocated opaque lenses.* In the first eye an attempt to do iridectomy failed, so the lens was removed entire with the wire loop, and with a very slight escape of vitreous. In the second eye the wire loop was also successfully used through an incision in the lower part of the cornea. The corneal wound healed in both cases without difficulty.

P. Stoewer[3] advises the immediate removal of a lens *dislocated into the anterior chamber;* if it is caught in the pupil it should be manipulated into the anterior chamber and then removed. When luxated into the vitreous and there are no symptoms, miotics may be employed as long as no irritation symptoms are induced. An attempt should then be made to coax the lens into the anterior chamber. Sclerotomy is to be performed if the media are cloudy from glaucoma and the lens cannot be located. Sympa-

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(1) Indian Med. Gaz., July, 1900.
(2) Ophthal. Rec., April, 1900.
(3) Zeitsch. f. Augenheilk., March, 1900.

thetic inflammation calls for enucleation, and this is also true of a cyclitis which has followed an unsuccessful attempt at extraction.

Both S. Klein[1] and L. Königstein[1] refer to cases of *vertigo* following removal of the lens. They both believe that the dizziness is produced by patients looking through the marginal parts of their strong convex lenses and to the prismatic effect this produces. Possibly also the muscular element in the cases should be taken into account.

G. C. Harlan[2] does not think prolapse of the iris in simple extraction as serious as many authorities consider it, and advises that hernias be left alone unless they interfere with the healing of the wound. For larger prolapses he advises prompt abcision, though infection of the iris or conjunctiva may necessitate delay. Occasionally, if everything be favorable, the iris may be replaced.

P. A. Callan[3] uses Knapp's knife-needle when the pupillary membrane in *secondary cataract* is thin, veil-like and of uniform color, but where the membrane is thick or tough he finds DeWecker's forceps-scissors the best. In the latter event the corneal opening should be large and 2 mm. from the limbus. Sometimes, when we have to deal with a small pupil, it will be necessary to include the iris sphincter in the incision to obtain a satisfactory result. It is then better to incise the iris above rather than below, for cosmetic reasons. In displaced pupil due to prolapse or incarceration of the iris it is necessary to make three incisions with the scissors, one on each side to free the iris and a vertical cut through the membrane and iris. The latter incision should be long enough to free the involved part of the iris. The amount of pupil displacement should indicate the length of the downward cut.

G. E. de Schweinitz and J. A. Andrews[4] have recently reported cases of cataract extraction where the *collapsed eye-ball* was successfully filled with physiologic salt solu-

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(1) Wiener med. Presse, June and July, 1901.
(2) Ophthal. Rec., Feb., 1900.
(3) Jour. Amer. Med. Ass'n, October, 1900.
(4) Ophthal. Rec., Aug., 1900.

tion after the method proposed by H. Knapp. The chief value of the procedure is that it fills the eye-ball after its collapse, prevents the sucking in of infective material from the surface of the globe and palpebral conjunctiva, and in some instances prevents retinal detachment.

E. Gutmann[1] reports operation upon forty-five cases of complicated cataract, mostly with myopic chorio-retinitis and fluid vitreous. [The good results, which are attributed to strict asepsis and care in operating, seem to justify the operation and the Editor cannot see any reason why, when both eyes are blind, an attempt should not be made to increase the visual capacity even in cases where full vision cannot be hoped for.]

Fuchs[2] again draws attention to *detachment of the choroid after cataract extraction,* having observed five cases within six months. The chief sign of this accident he found to be partial or complete obliteration of the anterior chamber within the first ten days after the extraction. The detachment was usually seen as a brownish black mass extending into the vitreous. There was also minus tension. He believes that a rent is produced at the insertion of the ciliary body and through this rent we have a communication between the aqueous chambers and the perichoroidal space. The aqueous humor passes through this tear and forces the choroid forward into the vitreous. He reports two cases in which the rent was plainly visible at the root of the iris. Strange to say, in all the cases the patient recovered useful vision.

Trousseau[3] points out that death occasionally follows the extraction of cataract. The fatal issue is sometimes associated with exhaustion; now and then with tetanus; with shock and pain in very old people; with sympathetic ophthalmia, etc.

Pagenstecher[4] reaffirms his faith in the employment of large doses of iodids in treating certain diseases of the

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(1) Arch. f. Augenheilk., Dec., 1899.
(2) Arch. f. Ophthal., 51-2.
(3) Ann. d'Oculist., March, 1901.
(4) Zeitsch. f. Augenheilk., Sept., 1901.

eye, particularly episcleritis, paralysis of the ocular muscles and affections of the oculonervous system generally. The doses range from 30 to 40 grains of potassic iodid given from three to five times daily—as well as sodic iodid and mercuric iodid. On the whole he prefers the last named as it is less likely to produce iodism and does not affect the heart. He thinks the sodium salt is generally preferred to the potash and advises the addition of potassic bromid where there is cardiac irritation from the iodids. [No mention is made of using the ordinary sweat, Turkish or Russian baths, in conjunction with the administration of the iodid. That iodism is prevented and the efficacy of the iodid salts greatly enhanced by ingestion at the same time of large quantities of water is another fact in modern therapy, especially in the treatment of eye diseases, that should not be forgotten. One to one and a half or even two liters of water may be given with sodic and potassic iodids, the doses ranging from 150 to 400 grains daily, with good results and no toxic effects.—Ed.]

THE UVEAL TRACT.

Iris. E. Jackson[1] reports a remarkable case of *exfoliation of the anterior layers of the iris,* which underwent a change in color from brown to blue and gray—just such an alteration as one would expect from loss of pigment.

E. von Bogusz[2] describes two cases of *total irideremia*—one in which, after a prolapse of the iris, the patient wiped the eye with his handkerchief and tore out the whole of the iris; the second was produced by an injury to the eye with the corner of a bedstead. This patient also wiped his eye upon a handkerchief, from which was extracted, next day at the clinic, the entire iris.

Rübel[3] gives an account of *cilium implantation on the anterior surface of the iris* in a mechanic who had been

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(1) Ophthal. Rec., Aug., 1900.
(2) Wiener med. Woch., July, 1900.
(3) Woch. f. Ther. des Auges, Jan., 1901.

struck in the eye with a piece of steel. For six years it had remained in the eye without producing any irritation. The lash passed through the pupil behind the iris and although there was no movement of it when the body moved, yet during pupillary contraction there was a noticeable motion of the free end of the hair. Vision was normal.

Pupil Reflexes. In speaking of that condition where the pupil, instead of contracting when the light falls upon the eye, becomes more or less dilated, Silex[1] reports a case that he saw a year ago. The anomaly followed an injury to the back of the head. There was no general disease or organic nerve affection. The writer suggests that the anomaly may be due, in his case, to the dense connective tissue formation at the point of the injury after the accident, and to the increased excitability and lowered resisting powers of the whole nervous system, including the pupillary fibers.

J. Piltz,[2] speaking of the Piltz-Gifford phenomenon (contraction of the pupils after energetic closure of the lids), considers that it is only an associated movement. He made observations upon twenty-two paralytics, twenty-five patients who were affected with insanity, eight epileptics, seven blind and twenty-three healthy persons. The phenomenon was seen in 43 per cent of the blind, 40 per cent of the paralytics, 28 per cent of those with insanity, 25 per cent of the epileptics and 4 per cent of the healthy. When on attempting to close the lids, closure was prevented by holding them apart, the pupil became small in 63 per cent of the paralytics, 48 per cent of the demented, 43 per cent of the blind, 27 per cent of the epileptics and 35 per cent of the healthy. This phenomenon is observed whether the pupils react to light or not. [It seems strange that although he acknowledges that Piltz mentions the prior discovery and publication by Harold Gifford of the Galassi lid-phenomenon, Schanz[3] persists in calling this sign the "Westphal-Piltz pupillary phenome-

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(1) Zeitsch. f. Augenheil., June, 1900.
(2) Neurolog. Centralb., Nov., 1899.
(3) Berlin. klin. Woch., 42, 1901.

non." The fact is that if one uses a double name it should be the "Galassi-Gifford sign," as both these observers independently discovered and employed it several years before it was known in German literature.—Ed.]

Iritis. Von Michel[1] analyzed eighty-four cases of *iritis* and notes the following items: Women are more prone to the disease than men. The average age is 40 and the disease is frequently one-sided. Chronic nephritis was found in twenty-eight cases and tuberculosis in thirty-one. The cases associated with syphilis were very few—only five. Disease of the heart and blood vessels was noted in thirteen cases. The conclusion is that primary iritis is almost always part of a general affection and the importance of examining all the organs, especially the kidneys, is great. It is remarkable that so little place is found for rheumatism as a factor in the etiology of this disease. Trousseau[2] believes that syphilitic iritis is usually the forerunner of graver manifestations of the general disease. Of sixty-one patients treated by him during the past seven years only six have escaped serious lesions, mostly of the nervous system.

R. W. Doyne[1] thinks highly of the use of radiant heat in eye diseases. He employs a 16 c. p. lamp. The patient sits by its side, keeping the eye as close as possible to it, with the lids closed; in cases of *chronic cyclitis or iritis,* apply five to twenty minutes three times a week or even daily. The whole side of the face gets intensely hot and even vertigo may be produced; afterwards general massage of the globe and cold douches may be employed. He finds this to be the best means of applying heat in those eye diseases where it is indicated.

J. Pruemm[4] gives the clinical history of 100 cases of *disseminated chorioretinitis* at the Giessen clinic. In most cases it developed at the age of puberty and both eyes were invariably affected. Complications were present in

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(1) Münch. med. Woch., July, 1900.
(2) Ann. d'Oculist., May, 1900.
(3) Trans. Ophth. Soc. of U. K., 1900.
(4) Inaug. Diss., Giessen, 1900.

one-third of the cases. These were chiefly iritis, hyperemia of the disc, vitreous hemorrhage, opacity of the cornea, detachment of the retina, etc. The cause was obscure in many instances although lues could be proven in 10 per cent of the cases, while chlorosis was observed in 14 per cent, scrofula in 12 per cent, measles and scarlatina in 10 per cent, articular rheumatism in 4 per cent. Myopia was present in 26 per cent. In many cases vision improved, but there were frequent relapses and the patients had to give up work when this occurred. In twenty-six cases no cause could be assigned for the disease. Subconjunctival injections of 4 to 10 per cent salt solutions (1 ccm.) were found beneficial.

E. A. Shumway[1] describes a diffuse punctate condition of the fundus and compares it with the various forms of dotted fundi described by Frost. His case he regards as an example of *Tay's choroiditis* now and then seen in the eyes of young adults. As is well known, the condition is not necessarily associated with defective vision, although an occasional account is given of night-blindness and contraction of the field of vision.

Senn and Spirig[2] believe that the so-called *chronic idiopathic iridochoroiditis* is a mild inflammatory disease which pursues a slow course and ends in blindness. It is usually bilateral and is often seen in persons with good health. The authors feel justified in concluding that, in many instances at least, the fundus changes are due to infection from chronic ozena or other purulent nasal disease, the infection being carried from the nose to the eye so as to seriously impair the nutrition of its tissues.

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(1) Ann. Ophthal., Oct., 1900.
(2) Wochen, Nov., 1900.

RETINA AND OPTIC NERVE.

Retina. Winselmann[1] reports a *detachment of the retina* following chronic irido-cyclitis. The patient was put to bed, half a hypodermic syringeful of salt solution was injected beneath the conjunctiva and a pressure bandage was applied. This treatment was repeated until nine daily injections were given. The vision greatly improved and in the eye with the recent detachment the retina had returned to its proper place. In two more cases the same result was obtained. L. Gabler[2] classifies the treatment of forty-four cases of *detached retina* in the Pesth dispensary. No internal medical treatment was of avail. Twelve were treated by scleral puncture, eleven by iridectomy, seven by a combination of both treatments. In one tincture of iodin was injected; the others were treated by pilocarpin, iodid of potassium and inunction. Three of the puncture cases improved, five improved after iridectomy and one after the combined method. The others were either unchanged by treatment or got worse.

Recently the Editor has drawn attention to the Inaugural Thesis of Staerkle, who gives an account of the treatment of detachment of the retina at the Basel Klinik. Twenty-three comparatively recent cases were given subconjunctival injections of salt solution. In ten cases there was a marked improvement, with complete restoration of the detached membrane in three. In nearly all (twenty-one) improvement of vision set in; in seventeen there was enlargement of the field of vision. As might have been expected, the more recent the detachment the more marked was the improvement. The operator began usually with a weak (2 per cent) solution, but finally employed a 4 and even a 10 per cent solution. In many instances the last strength seemed the most effective. The author thinks that the exosmosis and endosmosis set up by the salt solu-

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(1) Ophthal. Klinik, Feb., 1901.
(2) Pester med. chir. Press, Nov., 1900.

tion reduces the amount of the subretinal fluid without decreasing the vitreous mass, thus permitting the retina to resume its normal position. There is, at least, one consideration not to be lost sight of in this connection. In choosing a form of treatment for detachment of the retina, this plan has the advantage of being without risk—which cannot be claimed for procedures like the Schoeler and Deutschmann methods.

F. M. Ogilvie[1] has collected all the published cases of *"holes" at the macula* and notes that they may be divided into those in which there is no detachment of the retina and those in which it is present. They are generally due to concussion injuries—blows from blunt objects, stones thrown from catapults and in one instance the lesion followed a bullet wound of the orbit. Most of these lesions of the retina were 1½ diopters in depth.

W. H. Fox[2] refers to the intense congestion of the iris, ciliary body and probably of the choroid and retina, which follows the *exposure of the eyes to the flash of electricity,* whether it proceed from lightning or from other sources of electric light. Intense pains in the eyes and head follow, with photophobia, congestion of the ocular vessels and marked contraction of the pupils. In some cases the lids are swollen and there may be an actual burn of the facial skin, lashes and cornea. The treatment is cold applications to the lids and the use of atropin. The injury is rarely permanent and the symptoms subside in a few days.

A case of *retinitis circinata* is recently described by de Schweinitz.[3] The lesion began a disc diameter from the edge of the papilla above, and almost at its edge below, making an irregular zone of yellow-white exudation about the macular region. The edges of this band are irregular and beset with pigment, while irregular pigment patches on an area of yellow exudate involve the macula itself. The retinal vessels are normal; so is the remainder of the fundus. [W. E. Bruner, in the *Annals of Ophthalmology* for

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(1) Brit. Med. Jour., July, 1900.
(2) Jour. Am. Med. Assoc., Oct., 1899.
(3) Ophthal. Rec., Jan., 1900.

April, 1899, gives a complete review of the literature of this interesting subject.]

O. Schoenwald[1] observed eighteen cases of *retinal thrombosis* and remarks that they occurred mostly between 50 and 70 years of age, and that arterial sclerosis was present in seven of them. Most of them had rheumatism and none syphilis. There was secondary glaucoma in four cases. In one-half, arterio-sclerosis of the retinal arteries could be seen with the ophthalmoscope, and in another the same process showed sclerosis of the choroidal vessels. *Spasm of the retinal artery* presenting most of the aspects of embolism of that vessel was noted by M. Sachs.[2] Fuchs, who examined the case, agreed with the diagnosis. No lesion but arterio-sclerosis could be discovered in the peripheral arteries. In three days the spasm subsided.

Optic Neuritis. A valuable paper on the diagnostic value of headache with double optic neuritis is presented by Williamson and Roberts.[3] Of 100 such cases, twenty-seven were proven by autopsies to be due to brain tumor, twenty-seven more were very probably of the same character; in two cases the necropsy showed distention of the cerebral ventricles but no tumor. Three cases showed a chronic interstitial nephritis only. Three others were caused by chronic lead poisoning, two by fatal cerebral abscess, two by tubercular meningitis, one each accompanied ulcerative endocarditis, purpura hemorrhagica and Henoch's purpura. Three recovered in which only chlorosis with cerebral symptoms was present. Six cases were probably syphilitic; two of these recovered with blindness and four with impaired vision. Two cases without localized symptoms continued six and two and a quarter years, respectively, and their termination is not yet. Of the remainder in which there were no lues and no localizing symptoms, eight recovered with blindness, three with impaired vision and eighteen with good vision.

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(1) Inaug. Diss., Giessen, 1900.
(2) Beit. zur. Augenheilk., 44, 1901.
(3) Lancet, May, 1900.

Choked disc, according to A. Merz,[1] can be produced by increased intracranial pressure, whether it be continuous, periodic or transient. From experiments on dogs and rabbits the writer concludes that the condition of the venous sinuses plays an important part in the production of "Stauungspapille." When there is increased intracranial pressure, the circulation is interfered with, bringing about stasis in the fluid of the subvaginal space. From the point where the central vessels enter the nerve sheath to the intraocular end of the opticus there is considerable compression. The nerve itself also undergoes pressure and in consequence of this there is disturbance of its lymph circulation, productive of the edema of the nerve heads and their changes. The coincidence of *enlargement of the cervical glands* with optic nerve atrophy or optic neuritis of both eyes in children is mentioned by L. Buchanan.[2] He believes that optic nerve disease can thus be traced to a former tubercular infection of the brain, cord or optic tracts and this seems a point in diagnosis well worth bearing in mind.

Straub[3] had a patient, in every other way healthy, who, after a cold, presented inflamed eyes with pericorneal injection; the media were healthy. A few days later the patient exhibited all the evidences of hyalitis with secondary iritis and keratitis. Under atropin and the internal administration of salicylic acid there was complete recovery. After the vitreous had cleared, a *papillitis* of 5 D. was discovered in both eyes, similar to choked disc. [A few cases of mild and often of well marked optic neuritis have been observed by the Editor where the first signs simulated a superficial keratitis. In one instance, recently noted, there was a history of abraded cornea following a foreign body extraction. As the vision did not improve, suspicions of deep-seated disease were aroused, and as soon as a clear view could be had of the fundus distinct

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(1) Arch. f. Augenheilk., 41-1900.
(2) Edin. Med. Jour., Feb., 1900.
(3) Weekbl. v. geneesk, Dec., 1900.

swelling and injection of the nerve head were discovered. The disc in the other eye was normal.]

As is well known, difficulties in *diagnosis between acute retrobulbar neuritis and hysteria* sometimes arise. The central scotoma, characteristic of neuritis, cannot be proved if the vision has fallen to complete blindness, and as the fundus is normal in neuritis or shows but slight changes, a suspicion of hysteria may arise. The pupil, however, is mostly enlarged in retrobulbar cases and reacts sluggishly or not at all to light, while headache and painful excursions of the globe are almost always present. L. E. Bergmann[1] relies upon the pupillary reactions, and especially upon the galvanic reaction of the optic nerve itself to decide in these cases. In hysteria this is very much diminished. D. T. Vail[2] draws attention to the frequent occurrence of nasal diseases in cases of *acute retrobulbar neuritis* and believes that the anatomic relations between the sphenoid sinus and the ocular structures have much to do with the disease. In every instance of optic neuritis the nasal cavities should be carefully examined and any anomaly should be treated.

Word-Blindness. Hinshelwood's report (Lancet, May, 1900) has called forth reports of a number of cases of *congenital word-blindness*. E. Nettleship[3] furnishes the history of five additional cases in which, while the visual and auditory memories were excellent in all other respects, there was no visual memory for letters. The patients were able to recognize only a few letters of the alphabet and were unable to read any words at all,even those of one syllable. As is well known, Hinshelwood ascribes this defect to organic deficiency in the brain cells where visual impressions of letters, and words in particular, are registered and stored. Nettleship points out that if Hinshelwood's theory be correct, we have to deal with a condition similar to congenital color-blindness, and that the disease is incurable. If, however, there are cases capable of cure, the latter will

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(1) Wiener med. Woch., Oct., 1900.
(2) Am. Jour. Ophthal., May, 1901.
(3) Ophthal. Rev., March, 1901.

be found in methodical instruction in writing as early as possible in life, while the brain cells and fibers are capable of development. The old plan of education by which the average child was first of all taught his letters would give a word-blind patient a better chance of improvement than modern methods. In the incurable cases it is better for both teacher and pupil that the situation be recognized so that the child may be educated along other lines.

Optic Lithemia. Sixteen cases of *lithemia of the optic nerve* are reported by Angelucci[1] in which he describes two forms of the disease, one that leads to papillitis with loss of large peripheric sectors of the field of vision, and a second form in which the papilla shows very little hyperemia, but a central scotoma without limitation of the field —a retrobulbar process. It frequently happens that no cause for the changes at the papilla can be discovered, except a very noticeable and protracted increase in the urates, or, perhaps, an articular or other form of rheumatism. The treatment should neutralize the excess of uric acid by antilithic remedies.

Amaurosis. A case of *dental amaurosis* is reported by H. C. Sloggett.[2] The patient had vision of one-half in the left eye, although the fundus oculi appeared normal. A few days afterward the eye became perfectly blind, without fundus changes. The extraction of several decayed teeth was followed by restoration of sight. There was a recurrence of the amaurosis, and again, after the removal of two central incisors, vision returned and has continued to be normal up to the date of writing.

C. S. Hawkes[3] relates the history of two families (four generations of one and three of the other) in which *optic atrophy* descended through the female branch to every male descendant, although the females were unaffected. The disease usually began at the age of 30, although one commenced as early as 14. When seen in its first stages the disease was found to be a retrobulbar neuritis.

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(1) Arch. di Ottal., 1899-6.
(2) Ophthal. Rec., April, 1900.
(3) Austral. Med. Gaz., July, 1900.

R. Paderstein[1] reports two cases of migraine [Charcot's *migraine ophthalmoplegique*], accompanied by paralysis of all the branches of the third nerve. The paresis lasted only one day in the first instance, while in the second, after some time, the paralysis became stationary.

TOXIC AMBLYOPIA.

J. H. Fisher[2] believes with Nuel, de Schweinitz, Holden and others, that *nicotin amblyopia* is not primarily a disease of the macular bundles, but of the ganglion and other retinal cells about the macular region. He directs attention to Langley's work on the influence of tobacco on the activity of ganglionic nerve-cells in general; it destroys their power of conducting impulses. Agreeing, in the main, with Fisher and Langley is a report of J. H. Parsons,[3] based upon investigations by the author himself. He believes it reasonable to suppose that the action of nicotin is not to produce in the first instance a retrobulbar neuritis, but a more peripheral action, constriction of the arterioles and eventually changes in the cone fibers, the inner granules, or both.

Several cases of alcohol-tobacco amblyopia, presenting retinal hemorrhage, are reported by W. Zentmeyer.[4] The writer believes that the lesions may also be produced by alcohol. After eight years' residence in Cuba, C. E. Finlay[5] reports that neither Cubans nor Spaniards are in any sense immune to tobacco. In proof of this he presents a series of ninety-two cases of well-marked alcoholic and nicotin amblyopia. This is directly opposed to statements made of the freedom of Cubans and Spaniards from tobacco amblyopia.

In *alcoholic neuritis* T. L. Brunton[6] has observed a con-

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(1) Inaug. Diss., Heidelberg, 1900.
(2) Ophthal. Rec., June, 1901.
(3) Brit. Med. Jour., June, 1901.
(4) Ann. Ophthal., July, 1901.
(5) Arch. Ophthal., May, 1901.
(6) Lancet, Dec., 1900.

dition of the pupillary reflex just the opposite of the Argyll-Robertson phenomenon. He has noticed that the reflex to light is rapid and extensive, whereas the contraction of the pupil on accommodation is slight and sluggish or entirely wanting, and in two instances he observed a dilation instead of contraction, on accommodation.

During the last three years cases of complete blindness (usually permanent) from the *drinking of essences* of various kinds—Jamaica ginger, essence of peppermint, etc.,—have been reported, presenting much the same symptoms as those instances of methyl alcohol amaurosis described by Dunn,[1] deSchweinitz,[2] Gifford,[3] Casey Wood,[4] Hiram Woods,[5] H. Harlan[6] and others. From these facts alone it may be assumed that it is the *methyl alcohol* (used as a solvent) in all of these mixtures that is responsible for the serious results. The symptoms were uniform in all the reported cases; for nearly twenty-four hours after the ingestion of the poisonous fluid, vision appears unaffected, but suddenly the patient becomes almost or totally blind. If he survives, improvement in sight slowly takes place, but this is likely to stop after the lapse of a few more days or weeks, and the sight diminishes until he becomes blind. The treatment is usually that of optic nerve atrophy, following neuritis.

A case of typical toxic amblyopia produced by a dose of *santonin* is reported by M. Inouye.[7] After taking an unknown amount of the drug the patient awoke next morning to find everything looking yellow. The xanthopsia persisted for three days and left a visual disturbance of the right eye. After six weeks the symptoms disappeared.

Illuminating gas as a cause of ocular disturbances is alleged by Purtscher,[8] who gives several examples of its toxic effect. In three cases exophthalmos, paresis of the

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(1) Va. Med. Semi-Monthly, Jan., 1901.
(2) Ophthal. Rec., June, 1901.
(3) Ophthal. Rec., Sept., 1899; July, 1901.
(4) Ophthal. Rec., Aug., 1899.
(5) Ophthal. Rec., Feb., 1899.
(6) Ophthal. Rec., Feb., 1901.
(7) Ophthal. Klinik, Aug., 1900.
(8) Centralb. f. Prakt. Augenheilk., Aug., 1900.

extrinsic muscles, paralysis of accommodation, narrowing of the peripheral visual field and (in one case) a double sided homonymous hemianopsia, were noted. He thinks the eye troubles in this last case must be attributed to hemorrhages into the cerebral cortex.

A case of amblyopia from *iodoform* is detailed by W. M. DeVries.[1] The patient, 9 years old, had a vertebral abscess, which was regularly syringed with 10 per cent iodoform in glycerin. The smallest injection contained 60 grams of the fluid. The patient suddenly developed a strabismus convergens with nystagmus; this was followed by emesis, headache, dilation of the pupils, increased pulse and temperature. An absolute central scotoma was found in the left eye; relative in the right. The fundi were normal. The muscular paralysis improved, but the left eye eventually had vision of only 1-60; right eye, 1-6. When last examined a scotoma for red was present in the left eye and V = 1-6; the right eye had improved until vision was ½.

L. Gonzalez[2] gives an account of optic-neuritis following the *bite of a scorpion*. Prompt treatment with diaphoretics and sodium iodid relieved the blindness and the patient ultimately recovered. This is one of a number of cases of toxic amblyopia reported from the bite of these animals. Five cases of optic neuritis following the excessive use of *thyroidin* have come under the observation of Coppez.[3] Four of these were in women and one in a man. The toxic amblyopia was of the retrobulbar type, giving rise to central scotoma. The drug was taken for the relief of obesity and the treatment was the same as in other cases of postbulbar neuritis. [No such report has appeared in English literature so far as the Editor is aware.]

Loss of vision following forty drops three times a day of the *fluid extract of hydrastis* taken for two months is reported by Straub.[4] Improvement took place on stopping the drug and treating the retrobulbar neuritis.

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(1) Weekb. v. Geneesk, Dec., 1900.
(2) Anal. de Oftalmol., March, 1901.
(3) Arch. d'Ophtal., Dec., 1900.
(4) Weekb. v. Geneesk, Dec., 1900.

THE VITREOUS.

H. Ziegner[1] reports a case of *hemorrhage into the vitreous,* associated with general arterio-sclerosis, which eventually disappeared under subconjunctival injections of salt solution. In three months vision was entirely normal. A case of *vitreous hemorrhage* occurring during a cerebral hemorrhage on the side opposite to the nervous lesion is described by Terson.[2] The writer does not consider it one of the ordinary accompaniments of cerebral hemorrhage.

Straub[3] believes that *hyalitis* and cyclitis are always intimately associated and that the form frequently found in urethritis, measles, erysipelas and in meningitis is not necessarily of luetic origin, although syphilis is a very common cause of both processes.

Schmidt-Rimpler[4] calls our attention to the exceeding rarity of *intraocular cysticerci* in modern times. He believes that before any attempt is made to remove the parasite an accurate diagnosis should be made. If it be situated in the vitreous he passes a knife at once through the coats of the eye, using a sawing motion. In two cases the parasite came through the opening made in this way; where it does not, a larger incision is made and the animal removed with the forceps. Cut muscles should be replaced and sutured. The wound heals readily and in many cases vision improves. Since all eyes with cysticerci sooner or later are destroyed by phthisis or purulent inflammation, the indications for operation are strong.

J. Hirschberg,[5] after obtaining a long series of good results with the Haab magnet, reports a case where a *steel splinter* had remained in the eye for three months. Trial with a smaller magnet failed; the Haab magnet and a strength of 12 amp. was necessary to pull the object to a point in the anterior chamber from which it could

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(1) Berl. klin. Woch., 13, 1901.
(2) Clin. Ophtal., Nov., 1900.
(3) Weekbl. v. Geneesk, Aug., 1900.
Zeitsch f. Augen., Aug., 1900.
(5) Centralb. f. Pkt., Augen., Oct., 1900.

be removed by the aid of a small magnet. The piece weighed 22 mg. Two days later cyclitis set in, and in two weeks enucleation was found necessary.

THE OCULAR MUSCLES.

A complete, although somewhat elaborate, routine of *examination of the eye muscles* is recommended by A. Duane.[1] "After making a cursory inspection of the patient to detect the presence of any obvious anomaly, I direct his attention to a cardboard sheet, a foot or more square, hanging on the opposite wall of the room. In the center of this sheet is a round black spot, one inch in diameter. I cover the left eye with a screen, and, first making sure that he is fixing the spot with his right eye, I pass the screen quickly from the left eye to the right. In so doing I watch for any deviation taking place in either eye, and at the same time ask the patient if he notices any movement of the spot. I then place prisms, appropriately directed, before the eyes, gradually increasing their strength until there is no longer any deflection. This neutralizing prism will indicate the amount and character of the deviation as measured by the screen test. The same prism may also abolish the apparent movement of the spot, perceived by the patient. If not, I change the prism until this movement is absolutely *nil,* and thus measure the amount and character of the deviation by the parallax test.

"If there is any noticeable deflection behind the screen, I then apply the *screen test in a second way* or by binocular uncovering."

He believes that the screen test is more reliable than the so-called parallax test, the Maddox rod or the phorometer. He claims that it is almost universally applicable and may be used with children who have not binocular vision. He also employs it during the course of an operation to gauge the result obtained.

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(1) N. Y. Med. Jour., May, 1901.

Probably the most important and most recent contribution to the *study of the oculo-motor apparatus* is G. C. Savage's monograph entitled "Ophthalmic Myology." [The Editor has perused the advance sheets of this admirable work, and although he does not agree *in toto* with the propositions there laid down, he considers the work, particularly in view of the author's many valuable and original contributions to the subject, to be well worthy of close perusal.]

A proper understanding of the work demanded of the extrinsic ocular muscles cannot be had, says Savage,[1] unless studied in connection with the fixed median and horizontal planes of the head. These planes of reference are defined as follows: The one is the median plane of the head, a fixed vertical plane passing down between the two hemispheres of the cerebrum, practically midway between the two orbits. The other is the fixed horizontal plane of the head, which always passes through the optic chiasm. If the two orbits are ideal in construction and position, this horizontal plane would bisect the lines of origin of the interni and externi of the two eyes, and, passing on, would cut the centers of rotation of the two eyes. In orthophoria, the head being in the primary position, the vertically acting muscles will cause the two visual axes to lie wholly in the fixed horizontal plane, and the lateral muscles will cause these axes to intersect at a point twenty feet away, without undue tension on the part of any muscle. The vertical axes of the eyes will be kept parallel with the vertical fixed plane of the head, without undue tension on the part of either oblique. He formulates the following laws: "The recti muscles must control the visual axes, the superior and inferior recti keeping them always in the same plane, the internal and external recti making them intersect at the point of fixation." "The obliques must keep the vertical axes parallel with each other and with the median plane of the head." To enable the recti and the obliques to obey these laws, without nervous tension,

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(1) Ophthalmic Myology, 1902.

should be the object in view in both the surgical and non-surgical treatment of heterophoria.

A. Duane[1] advises that after *tenotomy* the patient be allowed to go about as usual and be encouraged to use his eyes for distant vision and to use both eyes together for all practical purposes. If the deviation be marked, exercises to stretch the divided tendon are instituted. No bandage is applied and deep sutures are avoided. He does not think that there is any danger to healing and that the risk of exciting inflammation of the wound from infection or other cause by this method is not at all great; nor does he think that there is any real danger of producing an excessive effect. If an accident of this kind does happen the over-effect can be neutralized by the use of a retaining suture. He does not believe that tenotomy, *per se,* is capable of producing an absolute correction of the muscular defect, and that it is as important to carry out a proper after-treatment as to attempt some particular kind of operation.

W. Reber,[2] after a study of 150 cases of *hyperphoria,* finds this anomaly present in 16 per cent of all ophthalmic patients. It is more likely to be latent before the thirtieth year and manifest after that time and occurs most frequently to the extent of 1°. The commonest symptoms are supraorbital, temporal and occipital neuralgia, photophobia, drowsiness and abnormal fatigue after prolonged near work. Plenty of sleep, open-air exercise and a well-regulated life are necessary to make hyperphorics comfortable. The condition is associated with esophoria in 57 per cent and with exophoria in 37 per cent of all cases. Compound hyperopic astigmatism, with errors of convergence, is more frequently present than all the other refraction anomalies. Convergence-training, if convergence be insufficient, and convergence repression, if convergence be excessive, frequently relieve the symptoms entirely. Vertical prisms give pronounced relief in one-half of all cases, one-half to two-

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(1) Med. News, April, 1900.
(2) Jour. Am. Med. Assoc., Jan., 1901.

thirds of the hyperphoria being corrected for infinity and two-thirds for near work. If these means fail, section of some one of the vertical muscles is indicated and about 5 per cent of all the cases whose deviation is two or more degrees will be more benefited by tenotomy than by any other procedure.

G. T. Stevens[1] believes that *"Normal" declinations of the retinal meridians* set up local symptoms; they are similar to and are often attributed to heterophoria. Dryness of the eye-lids, smarting of the eyes and foreign-body sensations, associated with obstinate chronic hyperemia of the globe (due to the pressure of the lids against the ball), are among these. These anomalous positions of the meridians are said to be extremely common and their presence may be determined by the clinoscope. A great variety of these declinations may be present and Stevens considers surgical interference the only proper means of correcting them. G. J. Bull[2] insists on the great value of the *stereoscope in determining the patient's power of binocular fixation* in heterophoria, and regards it as a valuable means of diagnosis in all anomalies of the eye muscles.

Does Amblyopia ex Anopsia Exist? This question is considered by S. Klein,[3] who observed a patient whose amblyopic eye had not been used for a long time, but who had again resumed its use. Vision gradually improved, and in time reached the normal limit, and this, he thinks, proves that the previous amblyopia was simply the result of non-use, for as soon as the visual functions of the eye were restored the amblyopia disappeared. He studied several cases in which this happened and adds that the discontinued use of an eye at a very early period of life always tends to amblyopia. When a child begins to squint early the eye is always affected. In many cases the amblyopia begins with strabismus in the first or second year of life, but in late strabismus, if the eye does not become amblyopic from some other cause, it remains free from ambly-

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(1) N. Y. Med. Jour., Feb., 1901.
(2) Ophthal. Rec., March, 1900.
(3) Wien. med. Woch., May, 1900.

opia. For the same reasons, Herrnheiser[1] concludes that the rule laid down by Priestly Smith with regard to the treatment of strabismus in children is a good one, namely, to bind up the good eye at regular intervals and compel the patient to use the squinting eye. He has no doubt whatever but that there is a true amblyopia ex anopsia, and that this may, in some cases, be prevented and in others the vision may be improved by simple exercise of the poor eye.

Strabismus. E. Landolt[2] much prefers *advancement* of the weaker or the too long muscle to tenotomy of the more powerful or shorter opponent. He believes that this method is based on the etiology of strabismus as given to us by Donders, and thinks that the frequent performance of tenotomy is based on the mistaken idea that it increases the field of excursion of the eye toward the side opposite the weakened muscle, an opinion which he has disproved on many occasions. He insists that we should not make a muscle feebler than its weak antagonist by setting it back, but should rather increase the force of the weaker muscle by advancing it. He commonly finds it necessary to do an advancement on both eyes, but he is rarely obliged to resort to tenotomy in addition. He makes an exception in those cases where a vertical deflection is associated with diplopia and where the deviation is only a few degrees; in such cases tenotomy may be done.

A simple *operation for divergent strabismus* is advised by L. W. Fox[3] in cases where the divergence is small. It is performed under cocain and comprises tenotomy of both external recti muscles, stretching of the conjunctiva and Tenon's capsule, and, after making an elliptical opening on the conjunctiva of the nasal side, suturing the opening. The last act of the operation is performed with a pair of broad retractor forceps. The conjunctiva is grasped vertically between the cornea and caruncle, directly over the internal rectus muscle. As much con-

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(1) Woch. f. Ther. des Auges, July, 1900.
(2) Jour. Am. Med. Assoc., Nov., 1899.
(3) Jour. Am. Med. Assoc., Aug., 1900.

junctiva and as much of Tenon's capsule as possible is included, separating all the tissue overlying the muscle itself. With curved scissors the upraised conjunctiva and capsule are excised and the wound edges brought together with four sutures, the upper suture being inserted through conjunctiva and Tenon's capsule. A similar suture is passed through the lower margin of the conjunctiva and brought out between the insertion of the inferior muscle and the margin of the cornea. Two more sutures are passed through the margin of the wound and united.

Miscellaneous. W. Seiffert[1] reports another instance of *relapsing oculo-motor paresis and paralysis* associated with attacks of typical hemicrania. Two cases of *unilateral ophthalmoplegia* (one total, of the nuclear form) are described by Maillard.[2] In consequence of the course which the paresis ran, it was believed to be due to a toxic form of neuritis in both instances.

The treatment of *congenital paralysis of the right superior oblique muscle* by tenotomy of the left inferior rectus of the left eye, is reported by Elschnig.[3] The desired result was obtained, although immediately after the tenotomy divergence of the left eye became apparent; this was controlled by cutting through the lower part of the external rectus tendon. The patient obtained binocular single vision, was able to work, and was much gratified with the result.

Retraction movements producing a *temporary enophthalmus* are described by J. Wolff, H. Knapp and A. N. Alling. Wolff[4] believes that this unusual condition is due to faulty insertion of the extrinsic muscles, and that the condition is always congenital. It is accompanied by narrowing of the palpebral fissure. Paresis of the external rectus of the retracted eye is usually present. Surgical intervention improves the eye from a cosmetic standpoint.

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(1) Berlin klin. Woch., No. 30, 1900.
(2) Ann. d'Oculist., May, 1901.
(3) Wien. med. Woch., March, 1901.
(4) Arch. Ophthal., May, 1900.

THE ORBIT.

The remarkable tolerance of the orbit to various *foreign bodies* is well shown in the history by Calderon[1] of two cases. In one an entire steel pen remained in the orbit three years without giving rise to any symptoms. In another case a piece of wood 4 cm. long and 8 mm. broad remained for three months before symptoms were set up. In each instance the foreign body entered below the globe and in neither case was the lower lid injured.

Experimental enucleation of one eye in young animals for the purpose of determining whether the removal of an eye in early life results in faulty development of the orbit has been carried out by W. E. Thomson.[2] This was done in a series of rabbits about the twentieth day of life. They were then kept from six to eight months and on *post-mortem* examination the orbits were carefully measured. There were marked differences between the normal and the anophthalmic sides, the defects being uniformly distributed in the latter. These were 10 per cent to 15 per cent in the length, height and depth of the orbit, the chief fault being in the development of the bones, less in the soft tissues.

A form of *orbital periostitis,* constituting one of the late manifestations of syphilis, is described by Antonelli,[3] the etiology being determined by finding in the fundus rudimentary hereditosyphilitic stigmata. There was considerable swelling beyond and above the nasal side of the lacrimal sac; on opening the tumor a slight discharge escaped. That an *orbital cellulitis* may be set up by an ethmoido-frontal sinusitis (in its turn produced by a dacryocystitis) is proven by a report by the same writer.[4] An operation upon the frontal and ethmoid sinuses, preceded by a nasal duct operation, brought about a cure.

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(1) Clin. Ophtal., Dec., 1900.
(2) Lancet., Nov., 1900.
(3) La Clin. Ophtal., April, 1901.
(4) La Clin. Ophtal., March, 1900.

Krönlein's[1] operation on the orbit for the purpose of *removing retrobulbar tumors through the temporal bone* with preservation of the eye-ball, has within the last two years been carried out with marked success by H. Knapp and others. Valude has performed this operation three times, once for an orbital angioma and twice for sarcoma. He considers the operation an easy one; it enables the operator to save the globe of the eye when, by the old method of operation, it would be impossible. It also permits a thorough exploration of the orbital cavity.

G. F. Suker[2] advises his modified *artificial sponge-globe method* after enucleation. A glass globe is imbedded or wrapped in a layer of very fine surgeon's sponge, sewed with cat-gut, all being thoroughly sterilized. This imbedded globe is inserted into Tenon's capsule, the latter being afterwards sutured with cat-gut. The straight muscles are brought together in pairs and the whole fixed by an annular ligature. The eye is dressed with a gauze pad which has been immersed in one part of boric acid and four parts of amyloform. If care has been taken to preserve complete asepsis during the operation very little reaction occurs. No pressure bandage is used and an ice-bag should be applied during the first twenty-four hours. The advantages of this operation are the complete immobility of the inserted globe, the better excursion of the artificial eye and protection from pressure by the globe on account of its sponge cushion. The latter is eventually absorbed.

A *hydatid cyst of the orbit* is reported by Isola.[3] The tumor was about the size of an orange and had pushed forward the eye to such an extent that atrophy of the organ set in and vision was lost. The removal of the tumor itself was accomplished with ease. An example of *orbital meningocele* is furnished from the practice of Lagleyze.[4] The patient had become so disfigured by the growth that it was decided to attempt its removal. The exophthalmos was so

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(1) Ann. d'Oculist., Aug., 1900.
(2) Ophthal. Rec., June, 1900.
(3) La Clinique, June, 1900.
(4) Arch. d'Ophtal., Dec., 1900.

pronounced that the eye protruded beyond the margins of the orbit. A retrobulbar cavity was found communicating with the meningocele sac by means of a hole in the vault of the orbit about 1 cm. from the orbital ridge; the eye was finally enucleated.

GLAUCOMA.

G. E. de Schweinitz[1] believes that in *unilateral acute glaucoma* one may infer the probability of invasion of the second eye if the latter present an abnormally shallow anterior chamber, opacity or swelling of the lens, a high degree of hypermetropia or smallness of the corneal diameters. If instillation of homatropin solution (Edward Jackson, G. C. Harlan, W. A. Bailey) gives rise to increased tension or retinal arterial pulsation, or if painless pressure on the globe with the finger tip produces arterial pulsation, or if there is a history of previous glaucomatous phenomena, the eye should be dealt with as if it were under the influence of the disease. He recommends that iridectomy (or some similar operation) should be performed on the better eye as soon as the anterior chamber is restored in the eye already operated upon, meantime the suspected eye should be kept under the influence of a miotic.

Recent literature contains many instances of *resection of one or more of the cervical ganglia* (Jonnesco's operation) of the sympathetic for glaucoma. H. W. Dodd[2] reports one of these where the superior cervical ganglion was removed in two cases of chronic glaucoma. He does not believe that it has proven of much value in either instance. D. H. Coover[3] gives the history of a case of simple glaucoma on which Jonnesco's operation was performed with encouraging results at first, the tension being lowered to

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(1) Phil. Med. Jour., Sept., 1901.
(2) Lancet, March, 1901.
(3) Phila. Med. Jour., March, 1901.

normal and contraction of the pupil brought about. Both the visual field and the visual acuteness increased. Unfortunately three months later an acute attack occurred reducing vision to light perception. Daulnoy[1] believes that there is a place for *sympathectomy* in the treatment of chronic simple glaucoma. If prolonged treatment with eserin and pilocarpin does not give good results, sympathectomy should be performed. He agrees with Abadie that glaucoma results from dilation of the ocular vessels through the influence of the sympathetic system.

De Wecker[2] believes that an *anterior sclerotomy* should be performed before an iridectomy is done, because the preliminary sclerotomy removes from iridectomy the ordinary dangers attendant upon performing that operation in cases of recent glaucoma. He is of opinion that the double operation enlarges the visual field and thinks that the preliminary procedure when carried out furnishes the greatest curative action when it is followed by an iridectomy, both for present needs and for those of future years. Fage[3] claims that the practical results of *opticociliary resection* in cases of absolute glaucoma justify a wider recognition of its usefulness. He says that the sheath of the nerve being opened, the perichoroidal space is freed. There is a lessening of secretion of aqueous humor owing to destruction of the ciliary nerves.

The use of *holocain for the relief of pain* in glaucoma is recommended by J. Hinshelwood.[4] He instilled a few drops of a 2 per cent solution of cocain into the eyes of a woman aged 50 years. Shortly after a typical acute glaucoma set in which the writer attributes to the use of the cocain; in consequence of this he is convinced that cocain should not be used if there is the slightest suspicion of glaucoma and never in the treatment of the disease. Where local anesthesia is required he employs holocain.

A profuse retro-choroidal *hemorrhage after iridectomy*

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(1) La Clin. Ophtal., March, 1901.
(2) Ann. d'Oculist., Nov., 1900.
(3) Arch. d'Ophtal., Dec., 1900.
(4) Ophthal. Rev., Nov., 1900.

for chronic glaucoma is reported by F. C. Hotz,[1] with eventual loss of the affected eye. The hemorrhage did not occur until twenty-four hours after a perfectly smooth operation in an eye that was shown by the ophthalmoscope to be free from any alterations in the retinal or choroidal vessels. C. A. Oliver[2] and W. C. Posey[2] both report cases of *hemorrhagic glaucoma* in which the usual unfavorable outcome is recorded. Oliver believes that in spite of the gloomy outlook in this disease we should not always conclude that nothing can be done. He mentions that in three out of eight cases vision was saved for periods of 8, 6 and 4 years with almost normal acuity and in two others the disease was kept in abeyance for a considerable length of time.

INJURIES TO THE OCULAR STRUCTURES.

Guende[3] relates a curious case where a 15-year-old boy was struck in the left eye with a hard ball, rendering him unconscious. He recovered with trembling of the iris and apparent motility of the lens. Tension was slightly increased. Vision was best with a concave lens of 3½ D. Eight-and-a-half months after the accident, vision without a correcting lens was 8-10; with —0.50, V=10-10. Two years before the accident the patient had a refractive error of one-half diopter of simple hypermetropic astigmatism. The writer believes that the zonula of Zinn had been injured and that the lens became more convex, thus producing a high degree of myopia. This he attributes to a stretching and not to a complete rupture of the zonula and considers it a confirmation of the Helmholtz' theory of accommodation.

E. Baeumler[4] reports three cases of penetrating wounds of the eye, involving the deep structures, and followed by infection of the latter. All the suspected parts were

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(1) Ophthal. Rec., March, 1900.
(2) Jour. Am. Med. Assoc., Dec., 1900.
(3) Recueil d'Ophtal., Oct., 1900.
(4) Klin. Monats. f. Augenheilk., Jan., 1900.

subjected to the *galvano-cautery,* carrying the wire well into the anterior chamber and even into the lens. In every case the eye was saved with useful vision and the writer considers that this is the best method we have of sterilizing infected wounds.

Six cases in which the sight of one or both eyes was lost or impaired by the passage of a *bullet through the orbit without wounding the eye-ball* are reported by E. Nettleship.[1] It is not always easy to determine just how the bleeding into the vitreous, the choroidal ruptures, the choroida-retinal exudations and the changes in the disc and nerve are produced in cases where the eye-ball has not been touched by the missile. Nettleship ascribes the intraocular injuries to the force of the projectile being changed into radial vibration of the tissue particles which act as secondary missiles. These, passing through the dense sclera, do not much damage it, although they seriously injure the less resisting choroid and retina. At the same time the dragging on the muscular insertions by the bullet contributes to the injury.

Miosis and ptosis from paralysis of the cervical sympathetic, after a gunshot wound, are recorded by G. C. Harlan.[2] The bullet entered at about the level of the cricoid cartilage five years before the writer examined him. Accommodation was not affected; the tension in each eye was doubtful and voluntary light movements were normal. The contracted pupil is thought by the writer to be due to paralysis of the radiating, nonstriated muscular fibers of the iris; the ptosis to paralysis of the nonstriated fibers in the levator.

H. A. Beaudoux[3] communicates a case of *commotio retinae from contrecoup.* The ophthalmoscope showed a large number of disseminated patches of gray opacity in the retina. Subchoroidal hemorrhages dotted the fundus although the macula could be plainly seen. These alterations disappeared in four weeks and the fundus presented

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(1) Brit. Med. Jour., Oct., 1900.
(2) Ann. Ophthal., April, 1901.
(3) Ophthal. Rec., Sept., 1901.

a normal appearance. For several months vision, which after the injury was much reduced, gradually improved until at the end of nine months it was $^{20}/_{20}$.

Explosion of the water glass attached to engines is a common occurrence, frequently giving rise to severe ocular injuries. S. Mitchell[1] reports several cases of these in which he was able to extract from the interior of the globe fragments of glass.

The observations of Andreae that the best remedy for *lime burns* is profuse irrigation with sterile water, instigated Schmidt-Rimpler[2] to experiment with the slaking of lime, and he concludes that lime injuries are not the result of combustion but of cauterization. He attributes the white opacity of the cornea to the formation of calcium albuminate, as did Andreae, but he thinks that as a therapeutic measure oil is superior to water, and advises that the eyes be immediately syringed with a large quantity of that remedy. As many of the little particles as possible should first be removed from the eye with oiled or dry cotton, gauze or linen held with forceps, after which almond or any bland oil should be used as just prescribed. On the other hand, H. G. Stutzer[3] endorses the suggestion made by Andreae to irrigate the eyes profusely with pure water. He prefers an irrigator, or for that matter (in carrying out first aid ideas) any vessel from which water can be poured in a thin stream from the height of one-half meter into the eye, held open by a fellow laborer. This can be carried into effect at once because water, and a vessel to carry it in, are always at hand, while there is necessary delay in searching for oil or glycerin. He does not think that the mechanical removal of lime particles with oiled cloths should be entrusted to laymen.

J. Brixa[4] attributes the changes in the eye from *lightning stroke* (iritis, lenticular opacities, etc.) and the symptoms (para-central scotoma, peri-corneal injection,

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(1) Ophthal. Rec., Sept., 1901.
(2) Berlin klin. Woch., No. 36, 1900.
(3) Deutsche med. Woch., 37, 1900.
(4) Klin. Monat. f. Augen., Nov., 1900.

photophobia, swelling of the lids, etc.) to the concussion and to the action of the heat, both of which materially disturb the oculovascular system. The effect of heat is seen in the edema of the lids, singeing of the eyelashes and in the transient clouding of the cornea.

Fracture of the orbit with much ecchymosis of the lower lid and the orbital tissues was followed (in a case reported by G. E. Bellows[1]) by monocular diplopia of the left eye. Two days later these symptoms disappeared; vision which was reduced to two-fifths gradually improving to normal and the patient finally made a complete recovery. C. S. Hawkes[2] describes a case of *fracture of the skull* in which there was no paralysis of the face or limbs and no direct affection of the eyeball, which was followed by a *rotary nystagmus* without lateral movement. This movement occurred twenty to twenty-eight times a minute, and was increased on attempts at convergence and continued during sleep. The nystagmic movements gradually became less, disappearing entirely at the end of a week. The writer thinks that it may have been produced by injury to the auditory nerve or labyrinth.

Bert Ellis[3] reports an instance of injury in which a piece of gunlock remained embedded in the frontal sinus for six and a half years, and had set up a chronic seropurulent discharge from a fistula situated slightly below the nasal margin of the left eyebrow. The patient had a hyperphoria of 20° after its removal. The muscles affected gradually improved, and he eventually obtained binocular vision. The gunlock measured 29x17x11 mm., and weighed 190 grs.

A case of *traumatic luxation of the lens* with secondary glaucoma, extraction without loss of vitreous and recovery with normal vision is reported by C. A. Veasey.[4] The patient had been struck upon the left eye with the fist five hours before admission. The pupil was almost verti-

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(1) Ophthal. Rec., 1901.
(2) Austral. Med. Gaz., Aug., 1900.
(3) Ophthal. Rec., May, 1900.
(4) Ophthal. Rec., Jan., 1901.

cally oval, about 9 mm. in its longest diameter, and presenting through it into the anterior chamber, in an almost vertical direction, was the edge of the lens. The latter had evidently made a quarter turn upon its vertical axis and pointing straight forward divided the anterior chamber into halves.

S. Mitchell[1] reports recovery with good vision and smooth healing of a *large wound in the sclera.* There were loss of vitreous and probable injury to the ciliary body. A portion of a wire nail had penetrated the globe, making a wound in the ciliary region from which protruded a large bead of vitreous with a portion of the ciliary body. The parts were cleaned and sterilized but no sutures were used. (Fig. 3.)

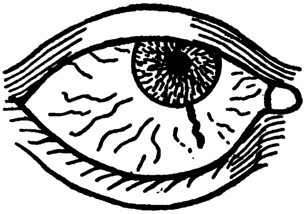
Fig. 3. Large wound of sclera.

A curious "V"-shaped *rupture of the sphincter of the iris,* with a similarly shaped rupture of the choroid on the nasal side, from a blow on the left eye with the metal end of a golf club is reported by G. E. de Schweinitz.[2] There were eventually restoration and preservation of normal vision. See frontispiece.

Sympathetic Ophthalmia. A report is given by O. Schirmer[3] of 160 cases of perforating wounds of the eyeball, of which sixty-nine were aseptic, sixty being saved with vision. Ninety-one were infected wounds, forty-five purulent, an inflammation of a chronic fibrinous character having been set up in the remaining forty-six. Schirmer believes that unless the eye is entirely lost attempts should be made to save it, provided it is not completely torn to pieces or is not the subject of panophthalmitis. Sympathetic ophthalmia did not occur in a single case. Enucleation was found necessary in twenty in-

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(1) Ophthal. Rec., June, 1901.
(2) Ophthal. Rec., May, 1901.
(3) Münch. med. Woch., Feb., 1901.

stances. The good results he attributes to the use of mercury in the form of inunction—6 to 9 grms. a day—and rest in bed. In addition to this treatment, which the author considers essential, subconjunctival injections, sweating, atropin and bandages were employed.

Large and increasing doses (60 to 75 grains daily) of *sodic salicylate* are recommended by Heuse[1] in the treatment of migratory ophthalmia. He has given this remedy for five weeks at a time and always with amelioration of the symptoms; in several cases with cure of the disease, even after the infection had reached the uninjured eye. It must not be forgotten, in this connection, that Harold Gifford had already advised the same line of treatment. Guibert[2] reports three cases of sympathetic disease in which the injured eye had not affected the fellow eye for many years, but finally some *debilitating disease* set up migratory ophthalmia. The original injury had occurred, respectively, fourteen, thirty and fifty years before. The author supports the theory of Panas, that before sympathetic ophthalmia can be brought about a general auto-intoxication must be present. A case recently reported by Rogman[3] lends probability to the Panas theory. He had a case of sympathetic ophthalmia which, after three months' duration, resulted in sudden deafness of the patient. The author attributes the loss of hearing to an inflammatory process beginning within the orbit and extending along the auditory nerves to the labyrinth.

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(1) Centralb. f. Prkt. Augen., April, 1901.
(2) La Clin. Ophtal., March, 1901.
(3) La Clin. Ophtal., Oct., 1900.

TUMORS.

The *Roentgen ray as a means of diagnosis* in intraocular tumors is recommended by Hirschberg[1] when the media are too cloudy for the ophthalmoscope. In the case of a tumor readily seen with the ophthalmoscope he found that a skiagram also readily demonstrated the presence of the growth. The tumor, a small-celled pigmented sarcoma of the choroid, was found in the exact position shown by the ophthalmoscope as well as by the radiograph. The diagnostic value of scleral puncture in *sarcoma of the choroid* is discussed by P. Schulz.[2] The plan recommended by Hirschberg and others was followed in the case of a man who had detachment of the retina with normal tension. When the suspicion of tumor arose a test puncture was made. The needle of a hypodermic syringe was introduced so as to strike the growth and a brownish-red fluid was aspirated. The syringe contents showed no characteristic tumor-cells, although an operation proved the presence of sarcoma. The author thinks that the test is not only useless in many cases, but that we run the risk of drawing out with the needle some of the tissue-cells into the conjunctiva and increasing the danger of a local recurrence. Hirschberg no longer recommends this method.

That the pigment in *melanotic sarcoma* of the uveal tract arises from the retinal pigment is the conclusion of Legrange.[3] He believes that the blood itself plays the major part in the pigmentation of melanotic tumors in general and of ocular sarcomata in particular. This cannot be definitely determined, however, until histochemistry has made known the process of pigmentation by furnishing a laboratory method capable of demonstrating the hematic origin of melanosis. The greatest number of pigment cells are found in the prescleroticregion

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(1) Centralb. f. pkt. Augenheilk., Nov., 1900.
(2) Klin. Mon. f. Aug., May, 1900.
(3) Arch. d'Ophtal., April, 1901.

corresponding to the lamina fusca. *Melanotic sarcoma of the choroid,* with recurrence five months after enucleation, has been studied by G. E. de Schweinitz and Dutton Steele.[1] In the particular case cited the growth appeared two or three years before glaucomatous symptoms set in. Instead of presenting the usual knob-like mass, it was flat and cake-like, characteristic lesions at the sclero-iridian angle fully explaining the glaucoma. There were nonpigmented sarcoma cells throughout the connective tissue framework of the optic nerve and the intravaginal space.

Alveolar sarcoma of the choroid, according to W. C. Posey and E. A. Shumway,[2] is well illustrated in a case investigated by them. Glaucomatous symptoms set in early because of the large area of choroid affected and because of the early involvement of the supra-choroidal space and the blocking of the lymphatic channels. There were marked inflammatory alteration and hyaline degeneration of the iris and ciliary body. Unlike most of these cases the patient was of advanced age—70 years. The retina was completely detached and degenerated throughout, the ciliary body was flattened and atrophic, the iris was pushed against the cornea and partially adherent to it, while the lens was pressed against the cornea and completely obliterated the anterior chamber. The growth extended along the inner surface of the sclera 22 mm., so its shape was like a low, flattened pancake, embracing the posterior outer quadrant of the globe. See plates IV and V.

Carcinomatous degeneration of a conjunctival papilloma, with infiltration of the eyelids, is reported by Risley and Shumway.[3] This rare tumor presented itself as a large granular mass covering the outer half of the left eyeball, stretching well into the folds at the outer canthus and spreading over the outer half of the cornea. It was very friable (tearing when grasped with the forceps) and

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(1) Ophthal. Rec., March, 1900.
(2) Ann. Ophthal., Jan., 1901.
(3) Ann. Ophthal., July, 1901.

bled freely. The growth had been removed several months before, but had quickly returned. The eyeball and those portions of the lid involved in the neoplasm were entirely removed and the resulting wound healed nicely.

Best[1] discusses the histology of *papilloma, pinguecula and epithelioma of the conjunctiva.* He believes that pinguecula never assumes a malignant type, although a marked infiltration of the subconjunctival tissue is seen as well as a proliferation of the epithelium, such as one sees in ulcers of the skin. Epithelioma approaches nearer to malignancy. The writer finds it difficult to separate papillomata from that form of cancer in which papillomatous formation is strongly marked, and many cases of tumor described as papillomata of the conjunctiva undoubtedly recur. When papilloma is multiple and its favorite seat is at the caruncle and limbus corneæ, and if the papillæ show no tendency to extend into the depths of the tumor, it is likely to be benign in character.

After a series of investigations of *retinal glioma* by means of the Golgi-Cajal method, Selenkowsky[2] agrees with the conclusions of Greeff and Haertel. Glioma consists mainly of spider-cells identical with those of the neuroglia, the retina and optic nerve. It also contains ganglion cells of different sizes. These tumors may develop from the nerve fiber layer, the ganglionic and inner granular layer or from the outer granular layer. In discussing the beliefs held by two contending groups of pathologists (that headed by Virchow and that which agrees with Wintersteiner), G. E. de Schweinitz and E. A. Shumway[3] believe that the subject is as yet not exhausted, but that the results of later work point to the probability of the epithelial character of glioma. Greeff and Haertel wish glioma to be called, on account of the numerous ganglion cells in it, neuro-glioma, ganglioma or (Klebs) neuroglioma. Wintersteiner, attaching special weight to the epithelial rosettes, first described by Flexner, proposes

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(1) Klin. Monat. f. Augenheilk., Sept., 1900.
(2) Physician, No. 5, 1900.
(3) Trans. Path. Soc. Phil., Dec., 1900.

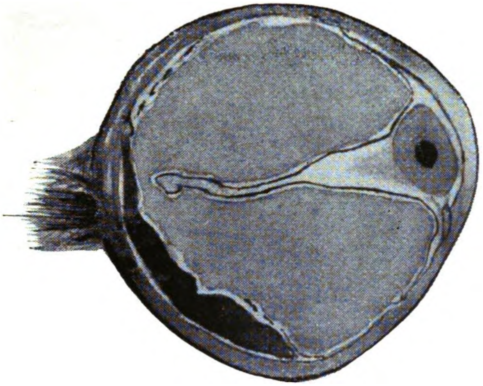

Fig. 1. Alveolar Sarcoma of Choroid.
Posey and Shumway's Article.

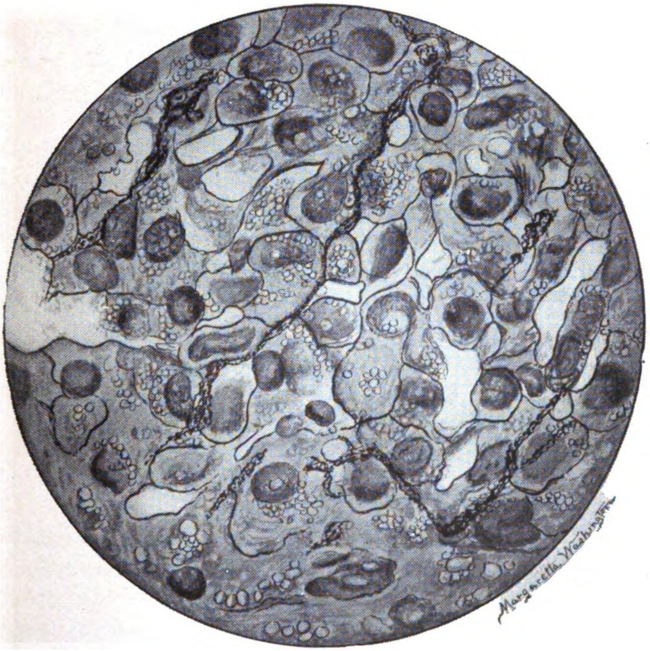

Fig. 2. Alveolar Sarcoma of Choroid.
Posey and Shumway's Article.

PLATE IV.

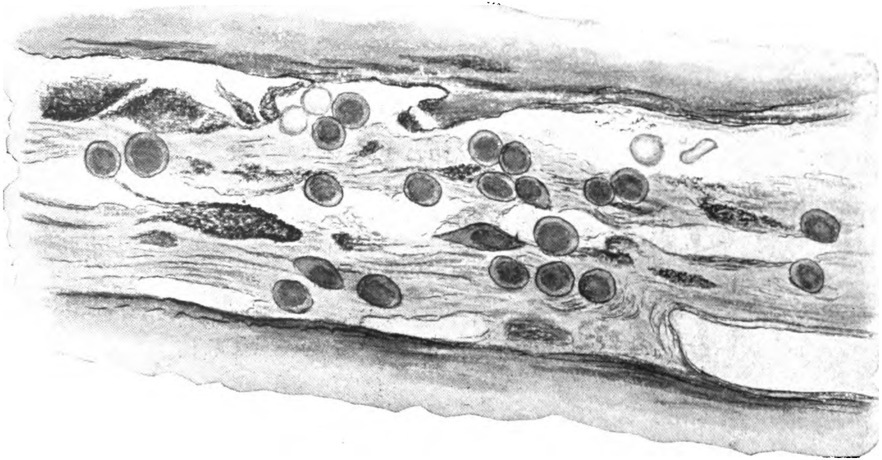

PLATE V.

Alveolar Sarcoma of Choroid.
See Posey and Shumway Article.

the name of *neuroepithelioma retinæ.* The rosettes consist of closed or partially closed rings of from ten to twelve narrow, web-shaped cylindrical cells, the lumen of the rosette being lined by basement membrane. He believes these cells and their processes to represent the rudimentary rod and cone cells. He found the rosettes in only one-third of the cases examined by him, but he does not think it necessary to demonstrate their presence in every growth because the misplaced cells do not always reach that height of development necessary to produce fully formed rosettes. He admits the presence of glia cells in glioma, but claims that they do not decide the nature of the growth, because such cells are always present normally.

A glioma—removed from a child four years old in January, 1896, which had not recurred to date—is reported by M. W. Zimmerman and B. K. Chase,[1] and deserves special mention. A microscopic examination was made of the enucleated growth, and it was found to extend from the ciliary body anteriorly to the optic entrance posteriorly, although there were no signs of protrusion through the sclera; the remaining vitreous cavity was filled with degenerated and compressed vitreous material. The optic nerve had been severed at a point 5 mm. behind the globe and was found to be infiltrated with cells as far back as the lamina cribrosa.

OPERATIONS ON THE EYE.

The *open treatment of operation wounds* of the globe is advocated by E. Heimann.[2] He acknowledges the advantages of the bandage—the immobilization of the eyeball and its protection from outside influences, mechanical or bacterial, but points out that the bandage may exercise unequal pressure on the eyeball and that it may easily

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(1) Ann. Ophthal., July, 1901.
(2) Münch. med. Woch., Feb., 1901.

become displaced. This causes stagnation of secretion within the sac, elevation of the temperature of the globe and promotion of bacterial growth. Normal movement of the eyelid is also prevented and pressure brought to bear upon the sclera causes wounds to gape. The bandage is sometimes responsible for marked psychic disturbances; accordingly he advocates modified open treatment by means of the shield or hollow bandage that allows the eye to remain open and does not interfere with movements of the lid. In this way protection of the eye from mechanical injuries, removal of pus, mucus and its bacterial contents from the conjunctival sac by lid movement is permitted, and there is less irritation, less congestion of the vessels and a free discharge of the conjunctival secretions. Coaptation of the wound edges is possible and less traumatic astigmatism results. Such a covering is less irritating to the patient and is less likely to give rise to psychic disturbances; inspection of the eye is also easier. [The editor has made use of this method of post-operative treatments for many years, and heartily advises it to the exclusion of the ordinary bandage.]

Systematic *cleansing of the nasal cavities before operations* involving opening of the eyeball is advocated by J. A. Lippincott.[1] He believes that the impossibility of sterilizing the conjunctival sac, as first demonstrated by Gayet, is accounted for by the free communication, through the tear passages, between the eye and the prolific breeding grounds of the nasal cavities. A few days before operating in every case a spray of potassium permanganate 1:2000 is thoroughly applied to the nostrils; this is repeated immediately before the operation and for three or four days succeeding it when there is any evidence of nasal disease. The writer believes that when this precaution is taken wounds heal with less than the usual degree of redness and that convalescence has been with him more speedy than in previous operations done without it.

An operation which might be called *blepharo-sphincter-*

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(1) Jour. Am. Med. Assoc., Oct., 1900.

ectomy for the cure of trachoma, parenchymatous keratitis and similar affections, is described by M. E. Mulder.[1] It consists in the removal of some of the subcutaneous fibers which pass over on the tarsus to the upper lid. This is done to lessen the pressure of the eyelid upon the cornea in all cases where disease of the latter is kept up or aggravated through contraction or spasm of the orbicularis. It is also designed to relieve ptosis and so free the cornea from constant contact with the diseased conjunctiva. The author believes that pannus is often prevented, that relapses are comparatively infrequent and that entropion is less likely to occur after this operation. The incision is made under cocain the entire length of the lid, 2 mm. above its border. By means of a second incision a small oval flap of skin, 3 mm. broad, is removed and with it all the underlying muscular tissue; the wound is then closed with three sutures, a bandage is applied for several days, after which the threads are removed.

A very valuable contribution to *pterygium* operations is made by J. O. McReynolds.[2] The various steps are described as follows:

"1. Grasp completely the neck of the pterygium with strong but narrow fixation forceps. 2. Pass a Graefe knife through the constriction and as close to the globe as possible, and then with the cutting edge turned toward the cornea shave off every particle of the growth smoothly from the cornea. 3. With the fixation forceps still hold the pterygium, and with slender, straight scissors divide the conjunctiva and conjunctival tissue along the lower margin of the pterygium, commencing at its neck and extending toward the canthus, a distance of one-fourth to one-half of an inch. 4. Still hold the pterygium with the forceps and separate the body of the growth from the sclera with any small non-cutting instrument. 5. Now separate well from the sclera the conjunctiva lying below the oblique incision made with the scissors. 6. Take

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(1) Klin. Monatsbl. f. Augenheilk., Nov., 1900.
(2) Ophthal. Rec., May, 1901.

black silk thread, armed at each end with small curved needles and carry both of these needles through the apex of the pterygium from without inward and separated from each other by a sufficient amount of the growth to secure a firm hold. 7. Then carry these needles downward beneath the loosened conjunctiva lying below the oblique incision made by the scissors. The needles, after passing in parallel directions beneath the loosened lower segment of the conjunctiva until they reach the region of the lower fornix, should then emerge from beneath the conjunctiva at a distance of about one-eighth to one-fourth of an inch from each other. 8. Now with the forceps lift up the loosened lower segment of conjunctiva and gently exert traction upon the free ends of threads, which have emerged from below, and the pterygium will glide beneath the loosened lower segment of the conjunctiva, and the threads may then be tightened and tied and the surplus portions of thread cut off. It is very important that no incision should be made along the upper border of the pterygium, because it would gape and leave a denuded surface when downward traction is made upon the pterygium. The advantages claimed for this method are that after the operation no disfiguring vessels remain in the palpebral fissure since the pterygium is hidden behind the lower lid; no denuded area of sclera remains; and the danger of recurrence is avoided." See figs. 4 and 5.

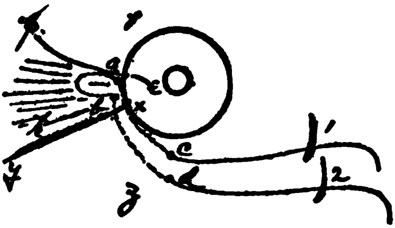

Fig. 4.

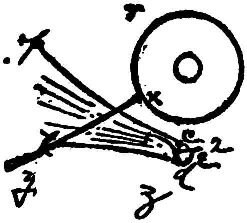

Fig. 5.

The wedge operation for *entropion* and *trichiasis* in which a modification of the Snellen method is carried out, is recommended by H. Herbert.[1] A strip of skin 2 mm. or more broad should be cut away in all bad cases and the depth of the tarsal wedge should be sufficient to completely divide the tarsus. No harm results if the conjunctiva is penetrated. The breadth of the wedge at its base largely depends upon the degree of entropion. The sutures should be entered as in Green's operation, the curved needle being introduced a little *behind* the lashes wherever they are situated and passed obliquely through the lower margin of the skin wound. The writer believes the effect of this operation to be permanent where the trachomatous process has come to an end.

A complete history of the various operations and surgical measures adopted from the earliest times to the present, in the treatment of *entropion* and *trichiasis,* is presented by M. L. Foster.[2] He believes that the most popular of these numerous procedures depend for their success on one or more of four principles, the shortening of the lid skin, its anchorage to the cartilage, the partial detachment of the ciliary margin and the reformation of the edges of the lid.

A report of a number of operations by the Fuch's method of *iris transfixion* is given by H. Aschheim.[3] It was done in eighteen cases in which there was *iris bombée* with exclusion of the pupil. An incision is made through the cornea, ½ mm. from its outer margin, with a wide Graefe knife, the handle so held that the blade is parallel with the surface of the iris. The puncture is then made through the prominent iris and the counter-puncture near the nasal margin of the cornea. The knife is pushed in until the entire width of the blade enters the counter-puncture section, when it is withdrawn. The purposes of this operation are to restore communication between the anterior and posterior chambers, the return of the iris to its normal position and the reduction of tension. It

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(1) Lancet, Nov., 1900.
(2) Ann. Ophthal., July, 1901.
(3) Arch. Ophthal., Sept., 1900.

is of no consequence whether one or more perforations are made provided any one of them remains permanently open. Success almost always follows unless iritis is set up. The writer believes that transfixion is in most cases preferable to iridectomy.

Writers are at variance as to the amount of myopia corrected by *removal of the lens.* E. Jackson's average estimate is 18 D.; Hirschberg's, 21 D.; Otto's, 20 D., and Percival's, 26 D. Jackson[1] believes that we can never predict with success the refractive effect of an operation until we know exactly what is the cause of myopia—what portion is due to axial defect, what to the lens and what to the cornea.

Good results were obtained by J. Silfvast[2] in 80 per cent of simple and 70 per cent of combined *extractions.* He believes that simple extraction is contraindicated in glaucoma, contracted or unyielding pupil, luxation of the lens, whenever the iris can be replaced, but does not become round (thus showing an inclination to prolapse), when a general anesthetic is used, and in cough.

A study of the diagnosis and *treatment of steel and iron foreign bodies within the eye-ball* has been made by Coppez and Gunzburg.[3] In all a review of forty-one cases is given, eight having the body lodged in the anterior and thirty-three in the posterior portions of the globe. In 14 per cent the eye-ball was saved, but without vision, while enucleation was done in 57 per cent. Siderosis was found to follow the retention of a magnetic foreign body in the eye for more than a year's time. It is stated that without Gerard's magnetometer a positive opinion could not in many cases have been given, even with the use of all the other well known means of diagnosis. Successful extraction of iron from the interior of the eye by the *Haab giant magnet* is reported by N. J. Weill.[4] A careful examination with the ophthalmoscope did not reveal any-

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(1) Jour. Am. Med. Assoc., March, 1901.
(2) Helsingfors Klinik, April, 1900.
(3) Arch. d'Ophthal., Sept., 1900.
(4) Ophthal. Rec., Feb., 1901.

thing abnormal and no foreign body or its semblance was discoverable in the clear vitreous humor and this, although a small wound of the free edge of the upper eyelid, with a similar lesion in the sclerocorneal region, was discovered after the accident. The pupil was horizontally oval. The wounded sclerotic was gradually brought to within 1 mm. of the cleansed magnet and a ¼ current was turned on. The patient felt nothing; then a one-half strength was used without result until finally the full strength current was applied for one minute when the splinter moved through the original wound in the sclera, pierced the conjunctiva and adhered to the magnet. It was roughly oval in form, scarcely ¾ of a mm. long, ½ mm. wide and weighed 0.5 mgr. The patient recovered with normal vision and seven months afterwards the eye was perfectly quiet and the scleral scar could not be located.

A description of *advancement of the ocular muscles without tenotomy of the opponents* is given by H. W. Wooton.[1] He employs a method somewhat different from that prescribed by Landolt and agrees with him that tenotomy of the opposite muscles should never be done except in very unusual cases, the desire being to strengthen weak muscles rather than to weaken and thus partially destroy the function of the stronger muscles.

A new and easy operation for *congenital ptosis* is advanced by F. Fergus.[2] It is said to produce less deformity than the operation of Panas. A horizontal linear incision is made in the eyebrow along its whole extent, this situation being selected because the hairs of the eyebrow afterward completely hide the scar. No other skin incision is required. With a few strokes of a scalpel the skin is completely separated from the underlying tendon and fascia of the occipito-frontalis muscle. The separation is carried to a distance of nearly two inches above the horizontal wound. In the opposite direction the skin, fascia and portions of the muscular structure are separated from

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(1) Arch. Ophthal., May, 1901.
(2) Brit. Med. Jour., March, 1901.

the orbicularis muscle and from the tarsus, the division being carried almost to the free margin of the eyelid. The next step is to mark out a vertical band of the tendon and fascia of the occipito-frontalis, about three-quarters of an inch broad and two inches long. This is dissected up from all underlying structures, and when the dissection is complete its only attachment is to the occipito-frontalis at the part farthest away from the skin incision. The end of the band is drawn down to the upper eyelid, and its margin secured by catgut sutures as near the margin of the lid as possible. The wound in the skin is closed and covered with a sterilized dressing. The wound heals rapidly and well.

When the globe is soft and yielding, Snellen, Sr.,[1] injects a sterile solution, with a little cocain, into the vitreous for purposes of *enucleation,* thus making the eye-ball firmer and lessening the pain when a general anesthetic is not given.

The *grafting of a rabbit's eye* into the human capsule of Tenon has been successfully accomplished in several instances by Lagrange.[2] There was rapid shrinking of the stump until the engrafted organ had reached about one-half its original size, after which no change occurred. The resulting stumps were well formed and freely movable. There was one failure due to the use of an eye from an old rabbit. For success it is necessary that the capsule should be thoroughly cleansed and that all hemorrhages should be arrested before the graft is introduced. At the time of enucleation of the human eye before cutting the muscles, sutures should be inserted for the purpose of drawing them together to close the wound. The conjunctiva should be carefully closed with interrupted sutures that should not be removed before the tenth day. The grafted eye should be from a young rabbit, of medium or small size.

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(1) Ann. Ophthal., Abstract, April, 1901.
(2) La Clin. Ophtal., March, 1901.

OCULAR SYMPTOMS IN GENERAL DISEASES.

The experience of A. R. Baker[1] in six cases of *albuminuric retinitis* as the result of gravidity, scarlatina and Bright's disease as well as in several anomalous forms of this affection leads him to believe that the prognosis is much more encouraging in the first two forms of the disease. He thinks that when the pregnancy is at once terminated, patients are much more likely to escape with eyesight and life than when action is postponed.

Several curious cases of *hysteric alopecia* of the eyelids are reported by H. Gifford.[2] One patient had been pulling out her eyelashes for a long time. The writer thinks that the trouble is perhaps more in the nature of a habit, like biting the nails, than a pure hysteric phenomenon, but it is closely allied to the latter. A case of left *homonymous hemianopsia,* probably *hysteric,* is reported by M. W. Zimmerman.[3] The defects in the visual field eventually disappeared, but reversal of the color fields was present after recovery. There was entire absence of any symptom of organic disease except ovarian irritation. All the eye symptoms disappeared with improvement in health.

It is well known that in *hysteric amblyopia* the supposedly blind eye actually sees, but the patient does not realize it owing to psychic conditions. Barraquer[4] believes that hypnotism is not of much use in this disease, but that suggestion, carried on for some time, produces a better effect. If, for example, the patient expresses a strong belief in certain forms of treatment it is well to either employ or simulate them.

Purulent metastasis following a *gastroenterostomy* for stone is reported by Propenko.[5] The patient became blind

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(1) Ann. Ophthal., July, 1901.
(2) Ophthal. Rec., Jan., 1901.
(3) Ophthal. Rec., March, 1901.
(4) La Clin. Ophtal., Dec., 1900.
(5) Mess. of Ophthal., June, 1900.

and noticed that an abscess was forming on the right side of his forehead. Ophthalmoscopic examination showed detachment of the retina with hemorrhages and a week later this was followed by an iridocyclitis, abscess of the left forearm and one in the left thigh. Three weeks subsequently the sclera perforated and pus escaped in which staphylococci aurei were found. The eye was excised and showed in addition to the detached retina an infection in the choroid.

Two cases plainly showing the slaty tint and pigment heapings in the fundus, described by Antonelli under the title *Rudimentary Ophthalmoscopic Stigmata in Hereditary Syphilis* are reported by Cruchaudeau.[1] These evidences of hereditary disease should be considered in all cases as they mostly persist through life and are to be classed with the Hirschberg corneal vessels and other evidences of congenital syphilis.

A case of thrombosis of the cavernous sinus following *pneumonia* and producing marked exophthalmos of the left eye, with dilated pupils and labored movements of the lids is reported by S. MacDonald.[2] Death occurred shortly after admission to the hospital.

An instance of *monocular neuritis optica* which disappeared with the removal of *adenoid vegetations,* is reported by Königshofer.[3] The patient was a young woman who complained of foggy vision in the right eye; the ophthalmoscope revealed swelling of the disc, and engorgement of the veins. Inunction and other internal medication produced little effect until the vegetations were removed. In a month's time the eye symptoms had entirely disappeared.

The ocular manifestations of *diabetes mellitus* are discussed by L. A. W. Alleman.[4] He agrees with Hirschberg that there is a distinctive retinitis presenting a degenerative and hemorrhagic type that distinguishes it

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(1) La Clin. Ophtal., Nov., 1900.
(2) Indian Med. Rec., Oct., 1900.
(3) Ophthal. Klinik., Jan., 1901.
(4) Jour. Am. Med. Assoc., Jan., 1901.

from other forms of retinal disease. Small punctate bleedings are always suggestive of diabetes and they are often associated with recurrent conjunctival hemorrhages. Another important ocular sign is a central scotoma, identical, almost, with the clinical picture of tobacco amblyopia. According to Landolt the refraction may be diminished in diabetes from changes in the refraction of the vitreous. The writer considers myopia quite common. It may accompany changes in the lens or is present even when there are no other evidences of cataract. Paralysis of the extrinsic ocular muscles is seen in mild as well as in severe cases of diabetes and is to be ascribed to nuclear or peripheral hemorrhages. Eye symptoms are, on the whole, of greater diagnostic than prognostic value. Nearly all of them may be seen early or late in the disease and they indicate rather existing nutritive conditions than the extent of the damage done to other organs.

Several cases of visual disturbance during or following *attacks of mumps* have been reported by Dor.[1] The symptoms were mainly foggy vision of a temporary character but in some optic atrophy. In one, optic neuritis was followed by atrophy in both eyes. The author believes that the optic affections are due to a toxemia.

Dufour, Courmont and Roulette[2] report cases of corneal complications in *variola* treated with subconjunctival injections, 1 :1000, of mercuric chlorid. Having seen three cases of blindness, they began in a second epidemic to use 1:500 solution of methylene blue. Of 691 cases of smallpox so treated, of which forty-five were complicated with infections of the conjunctiva and cornea, they did not lose a single eye.

A severe case of dendritic ulceration of the cornea from *malarial poisoning* is reported by Leprince.[3] A cure followed prolonged treatment of an appropriate local and general character.

Whether in *scrofulous or tuberculous individuals* infec-

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(1) La Clin. Ophtal., Aug., 1900.
(2) Ann. d'Oculist., May, 1901.
(3) Ann. d'Oculist., May, 1901

tion of the intact conjunctiva occurs is the question raised by W. Uhthoff.[1] Eighty per cent of his cases of "scrofulous" ocular affections reacted to tuberculin and were probably tuberculous. Tubercular choroiditis, according to Galezowski[2] is a commoner affection than is generally supposed; while tubercular perineuritis may be provoked by cerebral tubercle, or by tubercular meningitis. He does not believe that pure tubercular conjunctivitis is at all common, while iris tubercles and infections of the lacrimal gland are not infrequent. The surgeon should always, in both cases, search other portions of the body to make his diagnosis certain.

That optic neuritis may be a sequel to simple *chlorosis* is well known and B. Muntendam[3] reports twenty instances of such a complication. Most of them recovered under treatment, but several became blind or almost so from progressive atrophy. The retinal changes in *chronic leukemia* are claimed by L. Pick[4] to be of two kinds, retinal patches and hemorrhages. The most frequent alterations are areas of retinal sclerosis found in the region of the papilla and close to the vessels. They are of various shapes, colors and sizes and often resemble the changes seen in albuminuric retinitis. Hemorrhages are less frequent and are usually found at the macula or disc and rarely in the periphery. They seem to have no direct connection with the blood vessels. The retinal changes are almost always present in malignant tumors of the stomach and other organs and their presence may be attributed to the action of toxins. Strange to say, they interfere very little with vision and may continue until the end without setting up subjective symptoms.

Amaurosis and amblyopia as the result of *acute uremic* optic neuritis and *renal lithiasis* have been studied by V. Zanotti.[5] The ocular symptoms of acute lithemia are

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(1) Berlin klin. Woch., No. 50, 1900.
(2) Recueil d'Ophtal., Oct., 1900.
(3) Dutch Abst. Ann. Ophthal., April, 1901.
(4) Klin. Monat. f. Augenheilk., March, 1901.
(5) Ann. d'Oculist., April, 1901.

visual disturbances that in a few hours increase and end in blindness. This was the case in one of the writer's patients who had an attack of nephritic colic. The eyes were affected simultaneously, there was an irregular reduction of the visual fields with central scotomata and intense photophobia.

Santos-Fernandez[1] believes that the enormous increase of amblyopia from retrobulbar neuritis during the Cuban war of independence was due to *auto-intoxication of intestinal origin* through lack of nutrition. The disease existed in its worse forms among the *reconcentrados* and those who suffered most from lack of food and attention to the simplest rules of hygiene. When these obtained sufficient nourishment a complete or partial cure followed.

THERAPEUTICS.

Chloretone. McI. Morton[2] has found *chloretone* to be a very useful agent in ophthalmic practice, particularly when combined with cocain as an anesthetic, the combination extending the period of anesthesia to four or five hours. When mixed with suprarenal capsule powder (10 grs. to the ounce) it preserves the solution for several days. Its anesthetic properties make it of extreme value in external diseases of the eye; it is useful in acute infections of the conjunctiva, of the lacrimal sac and nasal duct.

Euphthalmin. Edward Jackson,[3] in speaking of that most useful of the late additions to our pharmacopeia, regards *euphthalmin* as a true mydriatic more valuable than homatropin. It has but a slight influence on the accommodation and it is the best agent we possess for producing a dilation of the pupil that does not alter under a strong light. Combined with cocain, it produces a satisfactory mydriasis for the examination of the eye, with the least annoyance to the patient and the most

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(1) La Clin. Ophtal., August, 1900.
(2) Ophthalmic Record, March, 1900.
(3) Ophthalmic Record, July, 1899.

rapid recovery. I. Woskressensky speaks enthusiastically of 5 per cent solutions of *euphthalmin* as a mydriatic in spite of the fact that H. Knapp noticed an acute attack of inflammatory glaucoma follow its use in a chronic case. He does not believe intraocular tension is increased by it.

Validol. This is a menthol-compound, oleaginous, with an ether-like smell and a rather pleasant taste when taken on a lump of sugar. Neustatter[1] has administered it in scotoma scintillans in 20-drop doses. He finds that in the majority of cases it relieves ocular headache and it appears to be a harmless product.

Tuberculin. In cases of tuberculosis of the iris and choroid, F. Schieck[2] finds injections of increasing doses of *tuberculin* of value, and thinks that with it even brilliant results may be obtained.

Pilocarpin. G. H. Burnham[3] believes that the internal use of *potassium iodid with hypodermic injections of pilocarpin* forms our best treatment for certain internal diseases of the eye, particularly in choroiditis with exudations, chronic iritis, muscular pareses and vitreous diseases. He advises the subcutaneous exhibition of from 1-12 to ¼ grn. every day, in groups of from six to twenty-one days; if nausea or headache results, it should be stopped for a few days. The patient should remain in bed for two or three hours and the treatment should be continued as long as there is any improvement—even to three or four years. [The Editor endorses all the statements made by Dr. Burnham, and further draws attention to the fact that the effects of pilocarpin injections may be greatly increased by the use of sweat-baths, taken at the time of the injection, with the ingestion of from one to two pints of very hot and weak lemonade, or hot water alone. As a general statement pilocarpin may be used in conjunction with the baths whenever iodid of potassium is indicated.]

Suprarenal Gland. Zimmermann[4] was among the first

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(1) Ophthalm. Klin., June, 1900.
(2) Archiv. f. Ophthal., Bd. 50, Ab. 2.
(3) Canad. Pract. and Rev., May, 1900.
(4) La Clin. Ophtal., Oct., 1900.

to draw attention to the local effects of *suprarenal capsule* upon the eye and believes that it has a marked therapeutic action in some cases, especially in intractable cases of glaucoma, where it greatly assists the action of miotics. Darier finds that three parts of pilocarpin and two of salicylate of eserin to ten parts of an equal amount of solution of dried suprarenal extract in water give him the best results. Wolffberg[1] again recommends the use of a suprarenal derivative under the name *atrabilin* [adrenalin], with formalin for its preservation. One to two minutes after its first application there is marked blanching of the entire conjunctiva. This is more marked in the case of normal eyes and in those affected with trachomatous pannus. It does not affect the pupil and is of great value in assisting the action of cocain, atropin, pilocarpin and eserin. It produces a marked cosmetic effect in removing all reddened areas from the eye, but its curative value is doubtful. The writer mentions the fact that Zimmermann has used it with advantage in lid operations. Takamine[2] has isolated one of the active principles of the suprarenal gland to which the name of Adrenalin has been given. Würdemann and others have done a considerable number of operations upon the eye-ball which were rendered bloodless by this agent. In the same way it is a useful adjunct in the preparation of the eye for operation under cocain and in from 1 to 1,000 to 1 to 5,000 solution appears to represent all the desirable qualities of the suprarenal extract without most of its objectionable elements. Probably Zimmermann's Atrabilin is similar in composition.

Dormiol. According to the editor of the *Annals of Ophthalmology,* Dormiol would seem to be a safe and reliable hypnotic for use after cataract extraction. Given in capsules, it is agreeable to the taste and no bad effects are noted on the heart or kidneys. It is an oily, colorless fluid, has a camphor odor and a cooling taste.

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(1) Woch. f. Ther. des Aug., Dec., 1900.
(2) Ann. of Ophth., Jan., 1901.

Sublimate. E. Guttman[1] recommends the instillation of a 3 per cent solution of sublimate in mucopurulent conjunctivitis and believes that the effect of this agent upon the secretion is remarkable. Its purulent character soon disappears, while acute forms of trachoma with follicular conjunctivitis (which sometimes take the guise in trachoma infections of the Koch-Weeks bacillus) are greatly helped. The solution is dropped once daily on the upper and lower lid, care being taken to avoid the cornea. The beneficial action is probably attributable to its disinfectant as well as to its astringent and caustic properties.

Dionin. Darier[2] discovered by accident that *dionin* possesses remarkable analgesic properties and recommends its use in allaying the violent pain of iritis, ulcer, iridocyclitis, keratitis and glaucoma. He places a small amount of the powder (about the size of a grain of wheat) in the cul-de-sac; this is usually followed by bleaching and, later, by an intense chemosis and swelling of the conjunctiva; the latter symptoms usually pass off in about an hour and the patient is comfortable. In many cases the effects of the remedy last two days. L. Vermes[3] has used *dionin* in 101 cases, particularly in external diseases of the eye, and has found the best results in corneal affections. He reports a case of pannus in which the cornea completely cleared up. In iritis it is also of extreme value, acting as a sort of counter-irritant and absorbent. He also recommends it in acute diseases of the ciliary body and in many chronic affections of the conjunctiva. [The Editor has employed dionin in various forms of iritis with the greatest satisfaction. It relieves the pain and probably cuts short the inflammatory process.]

Acoin. G. Hirsch[4] has repeated Randolph's experiments as reported in the *Ophthalmic Record* of August, 1899, and finds that *acoin* has no effect on either the pupil, accommodation or external blood vessels. It does not produce

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(1) Deutsche med. Woch., 1899. 44.
(2) La Clin. Ophtal., March, 1900.
(3) Woch. f. Ther., Feb., 1901.
(4) Arch. f. Augenheilk., Nov., 1900.

toxic symptoms when used in the form of subconjunctival injections. It acts as a local anesthetic in 1 per cent solutions, although one must wait for four or five minutes before getting the full effect. The anesthesia is more pronounced and lasts longer than cocain. A few drops of a 1 per cent solution added to subconjunctival injections greatly relieve the pain.

Jequerity. J. Masselon[1] reminds us that *jequerity* should be used only in those cases where granulations are unaccompanied by marked secretion; that it should never be given where there is suppuration. It is especially indicated in old trachoma with pannus and sclerosis of the cornea; it should be thoroughly pulverized and applied to the conjunctiva with a camelhair brush, the lids being everted so that the cornea is protected. The powder is allowed to remain in contact with the lids two to five minutes, and is then brushed off. If the reaction is not marked, the application should be repeated next day. The subsequent inflammation should be treated by cold applications and mild aseptic washes. In the hands of Lapersonne[2] a 1 per cent aqueous solution of *abrin* produces the best results. After cocainizing the conjunctiva the internal surface of the upper lid is thoroughly rubbed with a cotton wad soaked in the solution. This is repeated on the second and (perhaps) following days. On examining some cases months after a cure had thus been wrought by the drug the conjunctiva showed scars from the remedial inflammation. He reëchoes the claims of many writers that as a remedy for pannus in trachoma it is unequaled.

Albargin. This silver compound Bornemann[3] considers undoubtedly superior to all other argentic salts in the treatment of infectious diseases of the eye. It is nonirritant and soon kills the various pathogenic cocci. It is a white powder soluble in water, does not decompose on exposure to light, and its solution gives a neutral reaction.

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(1) La Clin. Ophtal., May, 1900.
(2) Arch. d'Ophtal., Aug., 1900.
(3) Woch. f. Hygiene d. Auges, 1901. 30.

It is used in 2 per cent solutions wherever silver nitrate or protargol is indicated.

Nargol. Another very recent silver candidate for ophthalmic honors is a nuclein compound called *Nargol.* It is recommended by several observers as a germicide of equal value with protargol. It is nonirritating and may on further acquaintance be found useful for such cases as would be treated by the other silver salts.

Largin. S. Stephenson[1] has employed *largin* in the treatment of superficial eye disorders, especially the different forms of ophthalmia. For the most part the remedy, in 3 to 10 per cent solutions, is painted over the exposed conjunctival surface once or twice a day. Its application, even in the concentrated form, is painless, but may stain the conjunctiva. It acts well in blepharo-conjunctivitis and in some cases of dacryocystitis; it is an invaluable substitute for silver nitrate against the Koch-Weeks bacillus. It is inferior to other remedies in gonorrheal ophthalmia and in diplo-bacillary conjunctivitis. E. Welander[2] notes that *largin* in 2 per cent solutions gives excellent results in blenorrhea of the eye. It should be applied with a brush six times a day to the everted conjunctiva, or gelatin discs may be placed under the upper lid—the latter taking about fifteen minutes to dissolve.

Protargol. Engelmann[3] recommends a 20 per cent solution of *protargol* in the treatment of ophthalmia neonatorum and believes it to be a better agent in every sense of the word than nitrate of silver. Kramer observed, in one hundred cases where the Crede method was used, inflammatory reaction ninety-six times, more than once attended by profuse secretion which persisted for several days. In 80 per cent of the cases there was increased secretion; in 50 per cent it disappeared after a day and in 4 per cent lasted until the fourth day. There was no reaction after protargol. S. Stephenson[4] is another surgeon who believes in

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(1) Brit. Med. Journ., March, 1900.
(2) Annals Ophthal., Jan., 1900.
(3) Central. für Gynaek., Nov., 1899.
(4) Edin. Med. Jour., April, 1900.

the superior qualities of *protargol* and uses a 10 per cent ointment, made with equal parts of vaselin and lanolin, in most cases of blepharitis. He prefers it to all other remedies in gonorrheal ophthalmia and in severe cases treats the conjunctiva twice a day with a 50 per cent solution. In acute mucopurulent conjunctivitis he uses a 10 per cent solution painted on the conjunctiva. He does not recommend it in trachoma, but injected into the sac through the canaliculi he found it of great value in dacryocystitis. After numerous experiments with *protargol* (1 to 10 per cent) silver nitrate, (1 to 12 per cent) and solutions of oxycynate of mercury (1:1000 and 1:5000 solutions) Hauenschild[1] concludes that infected wounds are soonest rendered antiseptic by the last remedy and he considers it superior for that purpose to either protargol or silver nitrate. A. Alt[2] believes that *protargol* has not been sufficiently appreciated by ophthalmologists and thinks that it possesses many advantages over silver nitrate. In the milder forms of catarrhal conjunctivitis a 2 or 3 per cent solution acts well and more quickly than silver nitrate. In stronger (10 to 50 per cent) solutions it is of great advantage in the conjunctivitis of the newborn. It does not cause argyrosis.

Argentamin. Arguments for the use of this silver salt are put forward by F. Daxenberger.[3] He commends it in all cases of conjunctivitis, brushing a 5 to 10 per cent solution over the everted lids. In addition to this a 3 per cent solution is to be instilled. The writer prefers it in ophthalmia neonatorum; also in 3 per cent solution as a prophylactic. He considers its value to be due to the fact that its bactericidal action is upon the sub-conjunctival tissues; that it is not superficial in action like most other silver salts. J. Imre[4] also uses 1 to 5 per cent solutions of *argentamin* in trachoma and other infections of the conjunctiva. He finds that it is well tolerated when these are complicated by

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(1) Münch. med. Woch., Jan., 1900.
(2) Am. Jour. Ophthal., Feb., 1900.
(3) Woch. f. Ther. des Auges, 1901. 1.
(4) Ungar. Beitr. zur Augenheilk., 1900.

corneal ulcers and iritis. He recommends it for acute infections, especially the follicular forms, but also finds good results from it in chronic trachoma. Once more Haitz[1] recommends *subconjunctival injection of corrosive sublimate or oxycyanate of mercury* and has found them extremely useful in central choroiditis, vitreous opacities and other intraocular affections but, he adds, unless the *specific* effects of these drugs is required, a 2 per cent solution of common salt acts equally well.

Quinin. L. Gonzalez[2] believes that 1 per cent solutions of *neutral hydrochlorate of quinin* are of great value in any suppurative infection of the cornea. The remedy produces a burning sensation which rapidly passes off; there is also some lacrimation. The day after the use of quinin the infiltrated zone of the ulcer is less distinct, the abscess is smaller and the cornea gradually clears—all due to the antiseptic action of the remedy.

Sperminum. *Subconjunctival injections of sperminum* are recommended by Jacovleff[3] in chorio-retinitis disseminata, neuro-retinitis and in a number of other diseases of the fundus. The Roehl preparation (1 ccm) is employed daily until improvement occurs.

Potassium Iodid. A. R. Baker[4] places much confidence in the use of large and rapidly increasing doses of *potassium iodid,* where this drug is indicated, and believes that most patients can eventually take from 100 to 300 grains daily, if the dose be gradually increased beginning with, say, 45 grains the first day. He believes that it should always be given after eating, with a large quantity of water, and that frequent hot baths should be administered during the use of the remedy. Not infrequently large doses will be tolerated when small ones are badly taken. The use of large doses should not be limited to specific cases, but are indicated in most examples of optic neuritis, ocular paralysis, choroiditis, serous iritis, relapsing iritis,

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(1) Klin. Monat. f. Augenheilk., Feb., 1901.
(2) Ann. de Oftalmol., July, 1899.
(3) Physician, Nov., 1899.
(4) Jour. Am. Med. Assoc., Nov., 1900.

cyclitis, and in interstitial keratitis. They are contraindicated in gray atrophy of the optic nerve and in most cases of postneuritic atrophy. Albuminuria is also a contraindication and the iodid should be cautiously given to children, who do not take it kindly. It is of doubtful value in early specific iritis as well as in the removal of postoperative exudates.

Nirvanin. C. A. Elsberg[1] has used *nirvanin* by the Schleich infiltration method and has favorably compared its anesthetic properties with cocain and eucain B in the strength of 1 to 1000. He finds it only one-tenth as poisonous as cocain and one-third as poisonous as eucain. It has distinct antiseptic properties and can be boiled without diminishing its anesthetic properties. Julius Wolff[2] does not agree with this writer, but finds nirvanin anesthesia to be very limited and unsatisfactory and that the solution causes considerable irritation, in the strength of 1 per cent to 4 per cent.

Aspirin. This is a white, crystalline powder, slightly soluble in water. Wicherkiewicz[3] has given it in capsules, a gramme night and morning and with bicarbonate of soda, and has employed it with success in chronic conjunctivitis due to long standing gonorrheal infections, in iritis, iridocyclitis, scleritis and episcleritis, rheumatic choroiditis with vitreous exudations and glaucomatous manifestations.

M. F. Coomes[4] has found *methyl blue* of great service in purulent conjunctivitis and applies it two or three times a day. He uses it also as a means of diagnosis in corneal ulcer and believes that it acts as an effective germicide. It stains only the denuded portions of the cornea.

Massage. *Massage of the eye* has been found very useful by A. Elschnig.[5] He recommends it in *chronic* trachoma with thickened tarsus, marked pannus or progressive ulcerations of the cornea that resist other methods of

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(1) N. Y. Med. Jour., Jan., 1900.
(2) Annals of Ophthal., April, 1900.
(3) Woch. Therapie d. Auges, Nov., 1900.
(4) Am. Jour. Ophthal., June, 1901.
(5) Wiener klin. Rundschau, March, 1901.

treatment. It is also of value in the recurrent keratitis of trachoma. He employs a probe armed with cotton and dipped into a solution of oxycyanid of mercury (1:4000), which is introduced beneath the eyelid, the latter being mediately pressed against the forefinger of the other hand held against the outer surface of the lid. A 2 per cent solution of cocain is used for the first two or three sittings, after which no anesthesia is needed. An ice-bag must be used immediately after the massage. At first this is carried out every day, then every two or three days, the duration of each sitting for each eye being five minutes. In conjunction with other methods of treatment massage is useful in most external diseases of the eye (except *acute* trachoma), particularly in all forms of chronic conjunctivitis, when these are associated with hypersecretion or with retention of secretion in the Meibomian glands, in phlyctenular conjunctivitis, spring catarrh, small chalazion, and in certain chronic diseases of the iris and even of the choroid.

In an article[1] on this subject the Editor has stated that he prefers *simple massage* with the tip of the finger to any form of the instrumental variety, such as direct rubbing with pieces of cotton wool, tetanization, the use of sounds or other devices. The sitting should rarely exceed three or four minutes and the best application for the purpose of *pure* massage is a drop or two of cod liver oil or pure castor oil. He prefers for disinfectant or stimulating medication mercurials of various strengths combined with oleaginous excipients, such as the citrine ointment diluted with brown cod liver oil. At the end of, or during the massage, combinations of the remedy with the ocular secretions, especially mucus, should be coaxed out of the sac by means of small pieces of damp cotton and the stroking movement resumed until nothing further comes away. He finds the most satisfactory employment of massage in chronic diseases of the lid-borders and substance, in almost all the sub-acute and chronic forms of conjunctivitis, in most

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(1) Jour. Am. Med. Ass'n., Nov., 1900.

forms of ulcer of and deposits in the cornea, for the temporary relief of glaucoma and in some forms of retinal embolism. He believes it is useless or harmful in the early stages of acute conjunctivitis and keratitis, in most forms of true trachoma, spring catarrh, disease of the iris, ciliary body, lens, choroid, vitreous, or optic nerve. Maklakof uses the Edison Spring modified for purposes of massage, the treatment lasting from five to ten minutes, the ball of the apparatus touching the eye directly. Various observers furnish contradictory reports of the good and bad results obtained from its use; most of these are favorable, especially where the treatment is employed in suitable cases; for example Corcashvili reports four cases of episcleritis in which the results were very good.

Miscellaneous. Wolffberg[1] advises continuous *hot air* applications by means of a tube extending over a compartment of sheet iron, the latter heated by four Bunsen burners. The end of the tube is furnished with a funnel-shaped cup through which a current of air is propelled by an electric fan, so that there is a uniform discharge of warm air from the tube. The temperature may be regulated by the use of from one to four of the burners. In iritis, some forms of keratitis and supraorbital neuralgia, these applications of the hot air douche were found to be very valuable and acceptable by the patient. The duration of the application varies from fifteen minutes to one hour.

Plaut[2] warns us that the excessive use of the *ice-bag* or bladder filled with ice, may be injurious instead of beneficial, and quotes a case where gangrene of the lid occurred as a result of injudicious applications of this kind. In all instances a cloth compress or greased gauze should be placed next the skin and the ice application should be removed every hour or so for at least 15 or 20 minutes at a time.

As the result of experiments with various bacteria, A. Dalen[3] believes that *irrigation with salt solution* is in every

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(1) Woch. Hygiene d. Auges., Oct., 1900.
(2) Klin. Monat. f. Augenheilk., Jan., 1900.
(3) Nord. Med. Arkiv., 1899.

way preferable to the use of 1:5000 of sublimate. The use of powerful antiseptics is contraindicated on account of their injurious effects upon the eye. He prefers a dry binocular bandage and finds there is an increase of bacteria when damp ones are used. Powdered iodoform does not produce any effect on bacterial growth. In other words, the mechanical cleansing of the eye is preferable to attempts at sterilization with antiseptics.

For protecting the skin about the eyes, for the treatment of fissures at the angles of the lids, in scaly and moist eczema of the latter, as a vehicle for powders and salves, Wolffberg[1] recommends the following formula:

Tragacanth	5,0
Glycerin	2,0
Water to make up.....................	100,0

Ohlemann[2] claims that *baths and mineral waters* have a distinct application in the treatment of eye diseases, particularly in iritis, acute inflammations of the sclera, choroid, retina, and optic nerve, in paralysis of muscles, in toxic amblyopia and all gouty, rheumatic, scrofulo-tuberculous, and syphilitic affections.

Scrini[3] writes in defense of the use of *oily solutions* and mixtures in ophthalmic practice. He much prefers the oily to the aqueous solution of eserin and believes that the absence of irritation, their slow but certain absorption and their soothing effects render oily collyria valuable agents in ophthalmic diseases.

Goldzieher[4] believes that the Haab method of disinfecting the anterior chamber by introducing into it small *iodoform rods* is a good one. He advises their use when the anterior chamber has been infected by pathogenic bacilli—as in hypopyon ulcer for example. They will also be found valuable in some cases of infection where, otherwise, enucleation would be indicated.

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(1) Woch. f. Ther. des Auges, Feb., 1900.
(2) Woch. f. Ther. Auges, Nov. 21, 1900.
(3) Arch. d'Ophtal., Feb., 1900.
(4) Centralb. prakt. Augenheil., March, 1901.

NEW INSTRUMENTS AND APPLIANCES.

Ophthalmoscopes. C. H. May has described a simple, cheap and very effective ophthalmoscope for the use of students, in the January, 1900, number of the Annals of Ophthalmology. It contains all the necessary lenses, with tilting mirror. A *pocket ophthalmoscope* combining all the lenses required for the ordinary examination of the fundus has been contrived by Brown Pusey.[1] It consists of a frame with two arms which swing on a hinge-joint. The arms carry two mirrors, concave and plane (for skiascopy), which are so placed that when the instrument is closed they are protected from injury. When the instrument is entirely open or closed a spring-bolt fastens it securely. Its extreme cheapness should make it popular with students. See Figs. 6 and 7.

H. Wolff[2] has so perfected the *electric ophthalmoscope* which he first described some years ago, that there is no corneal reflex to be seen during an ophthalmoscopic examination, while the fundus may be very readily seen through the partially dilated or contracted pupil. The author also claims that a much more distinct, brilliant and effective illumination of the background is possible, and a more satisfactory observation of minute changes in the fundus can be made with this instrument. [Combined with it for the purpose of testing pupillary reactions is a tube with a convex lens of 25 mm. focal distance and a diaphragm of 8 mm. aperture. The end of the tube is placed 5 mm. from the eye, and a pencil of light is emitted, wide enough to readily observe the pupillary movements and so narrow that its rays impinge only on particular areas of the retina or iris. For the eliciting of the hemiopic pupillary reaction it should be a very useful instrument. —ED.]

The *stereoscopic treatment* of appropriate cases of *stra-*

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(1) Jour. Am. Med. Assoc., Dec., 1901.
(2) Ann. of Ophthal., Oct., 1901.

bismus is referred to by C. Worth.[1] The writer has invented an instrument which he calls the *amblyoscope,* by which he aims to produce simultaneous vision in both eyes. He claims that it is adapted for use in strabismus of all degrees and that the suppression of vision in the deviating eye is readily overcome by the unequal illumination of the object slides, instead of by the continuous exclusion, difficult to carry out, of the other eye. The variety of the pictures amuses the child so that he will give all the help he can. [A recent modification of the stereoscope pictures of Kroll is recommended by Würdemann. These can be obtained from Chambers, Inskeep & Co., Chicago, and will be found of great value. They may be used with any com-

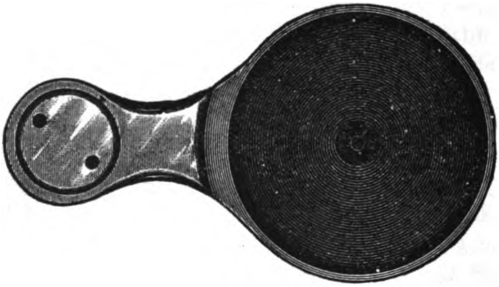

Fig. 6. Pusey Ophthalmoscope. Closed.

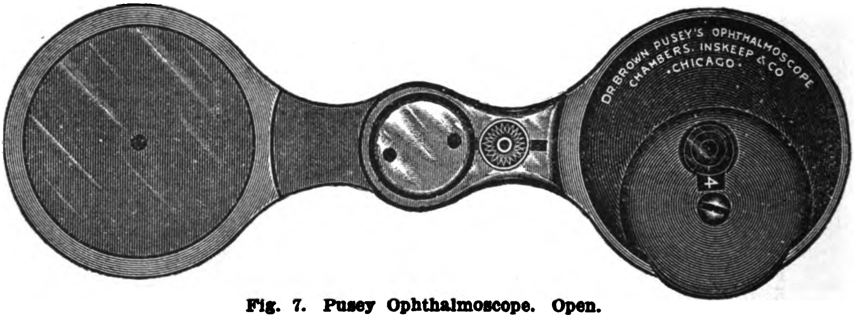

Fig. 7. Pusey Ophthalmoscope. Open.

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(1) Lancet, May, 1901.

mon stereoscope.—ED.] G. C. Savage[1] claims several advantages over other forms of the *phorometer* for his monocular instrument. The objection to the binocular instruments of Stevens and Wilson is that the images of both eyes are disturbed, whereas in his own instrument one eye preserves the primary position. The kind and quantity of the error are more easily measured.

Snellen[2] in 1898 had prepared at Mueller Bros. a *hollow artificial eye;* there can be no doubt that they are less irritating than the old shell, not to mention an improved cosmetic effect. They are made of thin but very strong glass, and do not weigh, on the average, more than 3 grm. They are not much more expensive than the shell-shaped models. J. L. Borsch[3] claims that several years prior to the invention by Snellen of the "Reform-Auge," his father, the well-known optician of Philadelphia, had Mueller construct several models of practically the same form as the Snellen eye. These were presented by Schwenk to the Ophthalmic Section of the College of Physicians and Surgeons of Philadelphia, and are referred to in their Transactions for February, 1897. See figs. 8 to 13 and plate III. It is but just, therefore, that an American should be awarded the credit of this valuable invention.

C. A. Veasey[4] describes a new and effective *portable sterilizer* for eye instruments, which may be neatly packed in a heavy cardboard box and takes up very little space in the instrument bag.

Wolffberg[5] again speaks of the so-called *hollow bandage,* which has the advantage of being very light, of not interfering with the movements of the eye, and of being kept in place by adhesion to the skin without irritation of the latter. Parchment paper is dipped in glycerin, molded closely to the border of the temples, forehead, nose-bridge and cheeks, glycerin jelly being used as an adhesive. The formula of this mixture is given under the head of Thera-

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(1) Ophthal. Rec., Sept., 1901.
(2) Klin. Monatsbl. f. Augenheilk., Feb., 1899.
(3) Ophthal. Rec., May, 1901.
(4) Ophthal. Rec., Feb., 1900.
(5) Woch. f. Ther. des Auges, Feb., 1900.

peutics in this volume. L. Sarason[1] is responsible for a *novel spectacle frame* which does not permit myopes to use their distant glasses for near work. The upper edge of the glass is fastened to the upper rim like a pendulum, which swings forward when the head is inclined.

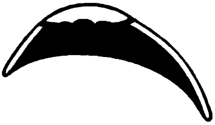
Fig. 8.

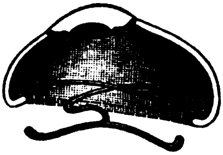
Fig. 9.

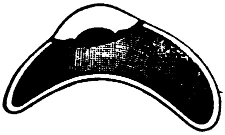
Fig. 10.

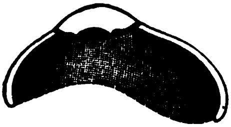
Fig. 11.

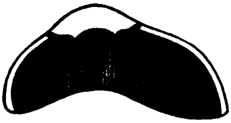
Fig. 12.

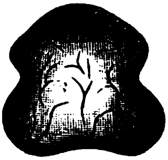
Fig. 13.

A. Duane[2] has designed a *clinometer* intended for measuring the torsional deviations of the eye, and the extent of paracentral scotomata; it may also be used for the detection of simulated blindness. It consists of two Maddox rods, which are mounted so as to revolve freely in a square metal frame sliding freely along the horizontal bar of a Stevens' phorometer. One plate is designed for the right eye, the other, of ruby glass, for the left. The plate is provided with a graduated arc and the revolving piece containing the Maddox rod has two indexes so arranged that when the index marked "V" is at zero and the phorometer bar is leveled, the line of light is strictly vertical; when the index "H" is at zero, the line of light is horizontal. When using the instrument for the first purpose mentioned, the patient is seated so as to face a small brilliant light at the end of a dark room. The patient looks with his right eye through the

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(1) Berliner klin. Woch., 35, 1900.
(2) Phila. Med. Jour., June, 1901.

right Maddox rod, which is then rotated until he says the line of light appears vertical. If the index "V" stands at zero, we know that his vertical meridian is truly vertical. If it points, however, to 8 degrees on that portion of the arc above the zero mark, we know that his vertical meridian has rotated by that amount to the left. Similarly, if the index points to 5 degrees below the zero mark, we know that the vertical meridian is rotated 5 degrees to the left. The test is then repeated with the left eye alone and after with both eyes together. In the latter case the two rods, one before the right eye, the other before the left are turned until the two lines of light, one white, the other red, appear vertical and either coincident or at least parallel. The same series of tests is then made for a horizontal line, the Maddox rod being turned until the patient says the line of light is horizontal and the amount of deviation from true horizontality is ascertained by an index.

This clinometer may be used for determining the amount of heterophoria, one eye being left uncovered; also as a test for binocular metamorphopsia and for the distortion produced by cylinders; as a test for scotomata and for retinal metamorphopsia and for the detection of pretended uniocular blindness. The instrument is placed with one rod before each eye, when the patient will see two lines, one red, the other white, either intersecting at an angle or else parallel and then blended into one. He cannot tell which eye he sees the red line with, nor in fact whether he does not see both lines with the right eye alone. To still further add to the value of this test the rods may be interchanged, by swinging the phorometer bar around, or both lines may be made to appear red by sliding a ruby glass before the white rod or either line may be cut off by shoving a card before the rod. The patient who alleges blindness is detected if he can be got to admit that he sees two lines or simply that he sees the red line formed by the red rod before the assumed blind eye.

Meisling[1] examines the visual field with a *perimeter* like that of Masselon. Care is taken to have the color tests of nearly the same color as the background so that they can be seen only in certain positions, thus preventing the patient from knowing just where he first saw the objects, which vary in size from 3 mm. in diameter up. The visual angle is further modified by the distance between the patient and the screen which for the smallest card is never greater than 1 mm. The record is marked to express not only the diameter of the object but the distance employed. Many contractions and scotomata commonly overlooked may be detected in this way.

Gradenigo[2] describes a new *tonometer,* which he thinks is better than those previously employed, most of which have been entirely discarded. It consists of a balance and a support; the first being a hollow cylinder of glass 44 mm. long, about the diameter of the human cornea; in the axis of this cylinder is a loosely fitting rod 2 mm. thick, perforated, and held in position by two wheels. One end has a ring-shaped piece to fit the cornea, while the other is connected with another rod which sustains the balance plate and rises a few cm. above the margin of the cylinder. Weights may be placed on this plate and a movable needle registers the result. The other part of the tonometer is formed of a strong metallic support. The instrument is sterilized, the eye cocainized and the patient placed in a supine position and the ring is placed exactly in front of the exposed eye-ball. The indicating needle, moved by the rod which presses on the eye, should be placed at the point in the graduating circle marked "O", then every deviation, determined by a fixed weight, will show the amount of resistance met with necessary to indent the surface of the eye. This instrument has the advantage of easy application, firm contact, and registers automatically the most delicate changes.

The Preservation of Eye Specimens. W. J. Watson[3]

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(1) Ann. d'Oculist., Sept., 1901.
(2) Annali di Ottal., 39, 1900.
(3) Eye, Ear & Throat Jour., April, 1901.

gives the following method of preserving specimens of eyes which is practically that used by Marshall at the Royal Ophthalmic Hospital, London, and the same that has been adopted by most museum curators and pathologists. It is almost identical with that described by Würdemann in *The Annals of Ophthalmology* for October, 1897. "Immediately after enucleation the eye is placed in tap water for about one-half hour. During this time any shreds of tissue are cleared away so as to thoroughly expose the sclera. It is then carefully wrapped up in oiled silk and placed in a freezing mixture of ice and common salt. The mixture should be placed in a cullender, so as to aid the easy escape of the water formed by the melting ice. If it is desired to preserve the cornea clear, the eye should be cleaned as quickly as possible before freezing, as water in a very short time produces opacities in that region. The freezing process usually requires about two hours. The eye should be frozen solid, and should give a sharp click when dropped on a solid table. No time now should be lost in making the section.

"Its plane having been previously determined, the bulb is divided by a thin sharp knife. The two pieces are placed in water to thaw out. As soon as the ice is melted, the desired half is put in a solution of water and glycerin, equal quantities of each, while the other half can be hardened in a 10 per cent formalin solution, so as to make microscopical slides.

"After six hours, the section is carefully transferred to pure glycerin. It must now be watched, for in case the sclera shows a tendency to curl up, the eye must be placed in a weaker solution of glycerin. When it has retained its shape in glycerin for ten hours it is then ready for the permanent mounting in glycerin jelly.

"Glycerin jelly is made as follows: An ounce of pure commercial gelatin should be soaked in eight ounces of water for fifteen minutes. Then place in an oven to melt, using a porcelain basin to prevent burning. After melting add the whites and shells of two eggs, and twenty drops of carbolic acid, to make it antiseptic.

"This combination is now boiled for half an hour, care being taken to stir it continually. After removing it from the fire, eight ounces of glycerin are added. The solution is now ready for filtering. This is the most tedious part of the process, as it is necessary to maintain a temperature of about 110° Fahrenheit, effected by means of the thermostat, or, if that is not available, a corner of the kitchen range will serve the purpose. Most of the debris can be removed by passing the solution through a coarse towel or a piece of flannel. It is then passed through filter paper (two thicknesses) at the temperature above described. The filtrate should be clear and transparent.

"Glycerin jelly can be made up in large quantities, provided enough carbolic acid is added to make it perfectly antiseptic. It is, of course, remelted each time that it is used. Instead of this doing any harm, it appears to remove some of the water by evaporation, which possibly makes the gelatin congeal more quickly. It should not be boiled, and should be placed in a warm place only long enough for it to melt. Should any deposit appear, it will have to be refiltered, at the same time adding a few more drops of carbolic acid.

"The section of the eye is now removed from the pure glycerin to one of the museum jars. Those with lenses are sometimes used, thus magnifying the object, but I think the plain are preferable and are also cheaper. The glycerin jelly is poured into the jar over the specimen. When the jar is full, the eye is turned over carefully to prevent the appearance of bubbles. Should the eye show a tendency to float, it must be kept down by light weights until the jelly has hardened. An hour later the little cover can be sealed on with Canada balsam. As soon as this is hardened, depending upon the quantity used, the eye is ready for museum purposes. The caution to keep the specimen in a cool place is hardly necessary. The time usually required by this method is about six days."

THE EAR.

THE EAR.

PHYSIOLOGY.

The manner in which sound waves are transmitted from the drum membrane to the labyrinth is still the subject of many experiments and no little speculation. Different observers draw different conclusions from similar experiments. There are many apparently insurmountable obstacles in the way of reaching definite conclusions. It is impossible to suspend the function of one part of the middle ear or labyrinth for experimental purposes without so interfering with the functions of the other parts as to render the results of little value. In postmortem examination it is exceedingly difficult if not impossible to determine just how much of the impairment of hearing during life had been due to this or that pathologic condition.

Some believe that the sound waves are transmitted from the drum membrane to the labyrinth via the ossicular chain and the oval window; and that the round window acts as a safety valve or pressure regulator for the labyrinthine fluid. Others believe that the sound waves reach the labyrinth through the round window and that the function of the oval window and the ossicles with their muscles is to regulate the tension of the drum membrane and the labyrinthine fluid. Still others believe that sound waves reach the labyrinth through both of these routes; while a fourth class believes that in addition to these routes the outer bony wall of the labyrinth is equally responsible for the transmission of the sound waves. The majority of otologists undoubtedly belong to the first class. After all, it must be admitted the subject is largely one of personal opinion.

A. Frutiger[1] reviews the experiments and opinions of several other writers, and states it as his opinion that under normal conditions the round window has little to do with the function of hearing, but that it is a protective apparatus for the ear, a yielding wall for vibrations of the labyrinthine fluid. Under pathologic conditions, however, the round window may act vicariously in conducting sound to the labyrinth. [While the Editor is not yet ready to adopt any of these foregoing theories to the exclusion of others, regarding the normal transmission of sound waves to the labyrinth, it does seem practically certain that under diseased conditions no particular part of the middle ear is essential to a moderate degree of hearing. With entire absence of the drum membrane, malleus, and incus, the patient may have fair hearing, though usually not better than the whisper at three feet. When the stapes has been removed and the oval window is filled with tough cicatricial tissue the patient can still hear. In one such case the whisper could be heard a few inches from the ear. However, this proves nothing regarding the limit of capacity for the remaining parts of the conducting apparatus, for it is impossible for any one to know just what influence the removal of the stapes may have had upon the labyrinth or just what effect the concurrent otitis media may have had upon the function of the round window.]

AURICLE.

Congenital Deformity. H. L. Wagner[2] reports a case of congenital *deformity of both auricles* in a boy aged 5 years. The deformity consists of an apparent absence of the upper part of the helix. The missing part can be easily traced lying underneath the skin of the scalp immediately above the ear. Careful examination reveals an "incisura helicis" which is produced by a conjunction of the enlarged helix

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(1) Archives of Otology, June, 1901.
(2) Laryngoscope, June, 1901.

and a second hidden cartilage running parallel to the upper visible helix. The antihelix is overdeveloped and runs without forming any crura into an abnormally deep groove. The relation of the antitragus is altered. The other parts of the ear show no deformity and the hearing is normal. The deformity is probably due to an arrest of development during the second and third fetal months, when the auricle begins to grow away from the head and to take definite shape. The boy's mental development is below par. [In a case which came under my observation the upper one-fourth of both auricles was embedded underneath the skin of the scalp. The cartilage of the auricle showed no marked deformity, and a plastic operation gave the boy fairly well-formed ears.]

R. T. Pooley[1] reports an *operation for prominence of the auricles.* The patient was an actress, 28 years of age. The operation was undertaken for cosmetic purposes only. An incision was made through the skin, along the entire length of the furrow formed by the junction of the auricle and the side of the head posteriorly. This was joined at each end by a curved incision carried over the posterior surface of the auricle, and the skin and subcutaneous tissue included by these incisions were dissected off. Two incisions, nearly parallel to the former ones, were then carried directly through the cartilage, and an elliptical piece of the latter, measuring about one-eighth of an inch by one-third of an inch, removed. The piece of skin was considerably larger than this. The wound was then united by seven interrupted sutures of black silk, four of which were passed through the skin only, while the three others were passed through both skin and cartilage. Owing to the natural folds of the cartilage it was found impossible to secure perfect coaptation of the anterior portion of the auricle and a small space was here left to heal by granulation. This operation was done without a general anesthetic, by using hypodermic injections of cocain and the frequent instillation of cocain over the wound during the

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(1) N. Y. Med. Jour., July 15, 1901.

progress of the operation, and was attended with a good deal of pain to the patient. Before beginning the operation the hair was shaved from the neighborhood of the ear and the meatus stuffed with cotton to prevent the entrance of blood. A strip of iodoform gauze, absorbent cotton and a firm bandage were then applied. Strict aseptic precautions were adhered to throughout the entire procedure.

The healing was favorable, the wound behind the ear healing by first intention, that in front by granulation. The sutures were removed about the fifth day. A few days later the other ear was operated on by the same method, but a somewhat larger piece of cartilage was removed and the anterior wound was a little larger. In this case, also, the wounds healed favorably; the posterior one *per primam,* the other by granulation; there was, however, on this side slight tenderness with some swelling of the cervical glands. Three weeks after the first operation the patient was discharged from the hospital. Both wounds had healed posteriorly, but a small button of granulation tissue remained on the anterior part of the right auricle. The patient was well pleased with the result.

Syphilis. F. R. Packard[1] reports three cases of syphilitic ulceration of the auricle. All recovered under specific treatment. Syphilitic affections of the auricle are not common, as Packard found only three in 2,500 consecutive cases.

AUDITORY CANAL.

Atresia. Three cases of *congenital atresia* of the auditory canal are recorded by Hunter Tod.[2] In each case there was malformation of the auricles. In one the auricle was rudimentary, only a ridge being observable. In another the deformity was slight. In one an operation had been done, and as long as the canal remained open the

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(1) Jour. Am. Med. Assoc., Feb. 2, 1901.
(2) Jour. Laryngol. Rhinol. Otol., March, 1901

hearing was considerably improved, but it was found impossible to maintain a permanent canal. Tod has collected detailed reports of fifty-seven cases. He finds that auricular deformity almost invariably accompanies complete occlusion of the external meatus. The auricle may be entirely absent. It may be represented merely by a fold of the skin or a row of cartilaginous tags; or the auricle may be so nearly normal that careful examination is necessary to detect the deformity. The cause of the deformity is believed to be due to arrest of development *in utero.* Other malformations associated with atresia of the canal and deformities of the auricle are: absence of the mastoid process, sacro-coccygeal fistula, deformity of the mouth, fistula of the cheek, asymmetry of the palate, and obstruction of the choanæ.

Tod believes that an attempt to establish an external auditory meatus, or to improve the hearing by operation in cases of congenital atresia, is never justifiable. He gives the following reasons: 1. The operation has never met with permanent success (one case excepted). 2. In all the other cases the atresia was due to bony obstruction. 3. In five cases there was no trace of the external meatus, although dipping in of the skin at the situation of the external meatus suggested it. 4. In nine cases either a depression of the bone or fissure was present, suggesting a canal. 5. In several cases hearing was said to be better while the opening existed; but the opening invariably closed, and the final result was *nil.* An interesting fact is noted, viz., that no case has hitherto been reported where a patient with congenital atresia of the auditory canal has suffered from any inflammatory disease of the middle ear or mastoid process. This raises the question as to whether the ordinary road for infection is through the patent auditory canal, and not from the Eustachian tube, as is usually supposed, or whether it may be due to altered conditions of the mucous membrane and the tissues of the middle ear.

The subject is summed up as follows: 1. The deformity is not hereditary, and the exact cause is not known. 2.

It occurs more often in females, and is more often unilateral than bilateral. 3. One may get accompanying deformities, chiefly due to maldevelopment of the parts in connection with the first and second branchial arches. 4. The labyrinth is rarely affected. The hearing varies, but is present in some extent, though slight. Hearing tests give practically the same results as in an uncomplicated middle-ear affection, but more marked. 5. Embryologic, pathologic, and clinical observation prove operations useless. 6. Something more, perhaps, can be done by careful non-operative treatment and by early and assiduous instruction in speaking and lip-reading.

Foreign Bodies. The subject of removal of foreign bodies from the auditory canal has received considerable attention. It seems to be the prevailing opinion that, as a rule, more harm is done by unskilful attempts to remove foreign bodies than by their presence in the auditory canal. Under ordinary conditions a properly directed stream of water is the safest and best method of removal. The diagnosis is usually easy, though P. Fridenburg[1] mentions several conditions under which a foreign body may be overlooked:—

1. If the drum has been perforated and the foreign body has passed into the tympanic cavity. Careful examination with the mirror may then reveal a perforation, and often a bulging of the drum, or dislocation of the ossicles and distortion of the membrane by pressure of the foreign body, and the probe will impinge upon a more or less unyielding mass behind the drum—perhaps in the attic. Secretion or exudate may conceal the perforation, and unless we have removed this deposit, the fact of perforation may escape our notice. Persistence of the symptoms or development of others pointing to acute otitis media may finally necessitate a free paracentesis of the drum, which exposes the foreign body and clears up the diagnosis.

2. If the canal walls are occluded by swelling of the soft parts from an otitis externa, due to injury by a foreign

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(1) Med. Rec., Sept. 21, 1901.

body, or more often to rough and unskilful attempts at extraction. This may be overcome by the use of a bivalve speculum, if necessary under general anesthesia, or in the absence of urgent symptoms we may wait for the swelling to go down, assisting by the application of leeches to the tragus and to the back of the concha, the instillation of astringents, and the use of hot moist compresses.

3. If the foreign body is incorporated with cerumen. The detection is then of minor importance therapeutically, as the removal of the plug—preferably by syringing—is indicated in any case. The probe may reveal the true nature of the mass.

4. When the sinus of the auditory canal is very deep and the foreign body lies in it. The sinus is a hollow in the floor of the meatus, directly in front of the drum. Its outer wall is almost at right angles to the axis of the canal. If the foreign body does not appear when the patient's head is sharply inclined to the unaffected side, or with the patient lying down, we may introduce a small middle-ear mirror, and so get direct inspection. We may reach a practical result more simply and rapidly, however, by thorough syringing, which will bring out a foreign body if any is present.

Among the many different foreign substances found in the auditory canals, C. Simson[1] reports *two live ticks (ornithodorus megnini)*, one in each ear. One tick came from the canal unassisted, while the other was killed with chloroform and then removed by syringing. While it is not a new procedure, it is well to bear in mind the fact that chloroform will quickly destroy the life of all animate bodies which may find lodgment in the auditory canal.

J. M. Ingersol[2] reports three cases of *animate bodies in the auditory canal.* In the first case a bedbug and in the second a cockroach was removed from the ear. In the third case the ear was found filled with a squirming mass of maggots. The patient said that he had had a purulent

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(1) Lancet, April 27, 1901.
(2) Laryngoscope, May, 1901.

discharge from his left ear for years. Three days before he came to the clinic he had lain down on the grass and gone to sleep. The following day his ear pained him and bled a little. On the morning of the third day he discovered some maggots on his pillow and with his finger removed quite a number from the auditory canal and the auricle. With a syringe and warm water Ingersol washed out 169 maggots. The ear was dried and four more were removed with a pair of small forceps, making 173 maggots altogether. The ear seemed clean then, and was dusted with nosophen powder. Evidently while the man was sleeping on the ground a fly had been attracted by the odor of the pus and had deposited eggs in the auditory canal. Most of the maggots were placed in a vial containing 90 per cent of alcohol, and at the end of three hours some of them were still alive and active. A few larvæ placed in a 1:1000 bichlorid solution were killed almost immediately, showing that if for any reason such larvæ could not be removed from the ear, a bichlorid solution is much more efficient than alcohol in destroying them.

M. Breitung[1] reports a case of persistent loud barking cough in a schoolboy, produced by an accumulation of cerumen around a foreign body in the auditory canal. After removal the cough disappeared immediately.

That *pus in the auditory canal* does not always indicate disease of the middle ear is shown by two cases reported by F. R. Packard.[2] In each of these cases there was suppuration of the parotid gland with pus escaping into the auditory canal through the incisura Santorini. The drum membrane was intact and the middle ear apparently normal.

M. Lannois[3] reports a case of hysteria and hysteric deafness due to a *broken needle in the auditory canal.* After the deafness, pain in the head and general hysteric attacks had continued for two years, the needle was removed, when all symptoms gradually disappeared. In patients with a

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(1) Wien klin. Woch., June 13, 1901.
(2) Jour. Am. Med. Assoc., Aug. 17, 1901.
(3) Rev. hebdom de Laryngol., June 1, 1901.

predisposition to hysteria an imaginary foreign body in the ear has been known to cause hysteric attacks.

Otomycosis. Fletcher Gardner[1] reports a case of otomycosis of the auditory canal in which the growth was identified as the *aspergillus flavecens.* Gardner is unable to find any report of the *aspergillus flavecens* as an aural parasite in America, though it has been frequently met with in Russia and Germany.

Polypus. Abercrombie[2] reports a case of polypus of the auditory canal arising from denuded bone in the floor of the canal. The drum membrane was intact. The trouble is supposed to have come from picking the ears with a pin.

Cerumen. G. C. Savage[3] reports excellent results in the softening of inspissated cerumen by the use of hydrogen dioxid. The remedy is warmed and allowed to remain in the auditory canal five or ten minutes, and usually in this short time it will soften the hardest kind of wax so it can be readily removed with a stream of water. After instilling the dioxid of hydrogen for five or ten minutes, if the accumulation of wax is recent, a brownish, frothy liquid will be removed by the syringe, the wax being actually dissolved. Sometimes the plug, being only loosened by the dioxid, will be easily washed out.

E. L. Meierhof has experimented with alcohol, glycerin, hydrogen peroxid, and the various salts of sodium, but he finds sulphuric ether superior to all in the softening of inspissated cerumen. The undiluted ether is poured from a small bottle or suitable pipette into the external auditory canal. The ether acts in a few seconds, partly dissolving the cerumen and loosening its attachment to the canal, so that, with gentle syringing, the plug is removed.

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(1) Wis. Med. Recorder, Sept., 1901.
(2) Jour. Laryngol., etc., March, 1901.
(3) Medicine, Feb., 1901.

DRUM MEMBRANE.

Anesthesia. A. A. Gray[1] gives a report of his experiments in anesthesia of the drum membrane by the use of 5 to 10 per cent cocain dissolved in equal parts of absolute alcohol and anilin oil. In a later publication[2] he makes additional reports of its use. Since its discovery by Gray the combination has been used in hundreds of cases by other otologists, who report that as a rule it produces complete anesthesia which lasts a sufficient time for any ordinary operation upon the membrane.

Homer Dupuy[3] has used the remedy extensively and finds it uniformly successful, although he uses a greater percentage of cocain. Rapid and deep penetration of solutions containing 15 or 20 per cent cocain would seem to increase the danger of drug poisoning. The fifty cases recorded do not bear out this inference, for in only one instance were any untoward effects noticed, and these were not of a serious nature. It will be of practical interest to briefly indicate the physical processes upon which depend the penetrating powers of this solution. Dehydration of the outer layers of the drum membrane is essential in order to effect penetration. By the abstraction of water from the tissues they contract, leaving interstices through which the fluid passes to the deeper layers, finally reaching the nerve terminations in the innermost layers. Osmosis, also, plays an important part in this process of rapid penetration.

Alcohol and anilin oil are both dehydrating agents, with this difference: that while the latter dehydrates, and is absorbed more slowly, its effects last longer. The high volatility of the alcohol and the slow absorption of the oil concur in producing rapid yet lasting anesthesia. As a preliminary step the instillation of hydrogen dioxid in the meatus is very effective in softening and dislodging

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(1) Brit. Med. Jour., April 21, 1900.
(2) Lancet, March, 1901.
(3) Laryngoscope, July, 1901

the loose epithelial tissue on an inflamed drumhead. The removal of these desquamated cells from the outer surface of the drum, and the washing away of other detritus in the canal by means of the usual syringing with a warm antiseptic solution, are very important procedures, for the reason that the parts will then offer less resistance to the penetration of fluids. The next, and all-essential, point is to fill the external meatus with the solution. This is highly important, otherwise osmotic equilibrium is soon established and penetration ceases. With the patient's head in the usual position of inclination to the opposite side about ten or fifteen minutes must elapse when anesthesia is generally complete.

As most of the anilin oil on the market is dark in color, it will be necessary to dry the canal with a cotton-tipped probe, or pledgets of cotton, so as to have a clear field. It is a good practice, before incising, to make sure that anesthesia is complete by touching the drum at the selected point with the tip of the knife. Dupuy thinks that the solution containing 20 parts cocain gives the most satisfactory and uniform results.

Later, Dupuy[1] reports a case in which severe toxic results followed the use of anilin oil in the ear. A patient with persistent pain in the ear was given a solution containing 15 gr. of cocain to the ounce of anilin oil, and directed to instill 15 drops every hour. After four applications the patient suddenly became unconscious and extremely cyanotic. The lips and nails were a bluish-black color, the face an ashy hue and the skin was cold and clammy. The entire surface of the body was covered with a profuse perspiration. The pupils were apparently normal, pulse 136 and compressible, respiration 36 and sighing in character, axillary temperature 97.3° F. These conditions continued for several hours when gradual improvement began. The next day her lips and finger-nails still presented a decidedly dark-blue tinge, but the rest of the body had regained its normal color. Atropin, strychnin and ammonia were

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(1) Laryngoscope, Oct., 1901.

kept up the whole night, yet the pulse was 136, small and thready. The cyanosis of the lips, finger-nails and the rapid pulse persisted for almost twenty-four hours. Though extremely weak for several days, she made a final recovery.

Gray,[1] St. Clair Thomson[2] and others have noticed slight toxic effects from the use of anilin oil in the ears.

THE MIDDLE EAR.

Acute Otitis Media. There are two separate and distinct forms of acute otitis media—catarrhal and purulent. The first is due to the extension of simple nasopharyngitis through the Eustachian tube to the middle ear, and is characterized by the presence of pain, deafness, sometimes fever, a redness of the drum membrane, especially Schrapnell's membrane and the malleal plexus, and a pouring out of a serous fluid in the middle ear. This fluid is free from the presence of pyogenic microörganisms. The second is due to the presence of some of the pyogenic microörganisms, and usually occurs as a result of forcing septic matter through the Eustachian tube. It is important to differentiate between the two varieties since the acute catarrhal form is amenable to abortive treatment at any time before the perforation occurs, while in the septic form the earlier a paracentesis is performed the better.

Acute Catarrhal Otitis Media. The chief subjective symptom in acute catarrhal otitis is pain. This is due to pressure on the membrane and walls of the middle ear by the fluid within its cavity. The pain varies in intensity in different cases. It may be slight and subside in a short time or it may be as severe as in the purulent form and subside only upon escape of the fluid through the drum membrane. The first object in treatment is to relieve the pain. This can be accomplished only by the relief of the pressure. The pressure and consequent pain can best be

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(1) Lancet, March, 1901.
(2) Lancet, April, 1901.

relieved, according to the editor's experience, by glycerin to which from 5 to 12 per cent of carbolic acid is added. The glycerin by its osmotic property causes the fluid to pass through the membrane. The carbolic acid by its anesthetic and antiseptic properties helps to relieve the pain and disinfects the auditory canal. The remedy should be applied by saturating a pencil of cotton of suitable size and pushing it with a twisting motion down against the drum membrane. The pencil should be left in the canal from six to twenty-four hours, and be replaced by another until the redness of the membrane has disappeared. The pain subsides usually in from five to fifteen minutes after the first application. When a paracentesis is done or the membrane ruptures spontaneously great care is necessary to prevent secondary infection. When secondary infection does occur the case assumes much the same characteristics, and is subject to the same complications as one which was originally purulent.

Acute Suppurative Otitis Media. While acute suppuration of the middle ear is an important disease in itself, it is of no less importance from the fact that practically all of the dangerous and distressing complications of purulent otitis media owe their origin to an acute infection of this cavity.

Edwin W. Pyle[1] emphasizes the *importance of a more accurate knowledge of the rudiments of otology* by the general practitioner, and a better understanding on the part of both physician and laity, of the value of correct early treatment of acute otitis media. If these cases are seen at all by a physician, and unfortunately many of them are not, it is the general practitioner and not the specialist whose aid is sought. The delicacy of environment makes it imperative to treat aural inflammations intelligently, in the very beginning. Were it possible to do away with the immense amount of temporizing in otology, deafness would cease to be an opprobrium to the profession. It should be definitely understood that the otologist has no power to

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(1) Med. Summary, Sept., 1901.

restore a function lost through neglect. When this becomes general knowledge, when the mother no longer feels herself competent to treat acute earaches, when the medical attendant can recognize causes and make a discriminating diagnosis that will introduce the early antiphlogistic treatment best suited to combat complications, then will otology have an impetus greater than ever received from any one mind or period.

In acute suppurative otitis media, W. C. Phillips[1] estimates that in 99 per cent of the cases the *infection reaches the middle ear through the Eustachian tube.* This is, no doubt, a fair estimate if only those cases are included which are primarily infected; but the editor's observations lead to the belief that when all cases of acute suppuration of the middle ear are considered, a very large percentage will be found which were originally acute catarrhal and became purulent only after the entrance of infection through the recent perforation.

All writers seem to be agreed upon the advisability of early and free evacuation when pus has accumulated in the middle ear. After paracentesis, Phillips recommends a thorough syringing of the ear with 1 to 5,000 bichlorid solution every two hours by the parent or attendant, and that the ear should be cleansed at least once each day by the physician. He finds the average duration of acute suppuration of the middle ear to be twenty-one days.

H. Gradle recommends thorough sterilization of the canal previous to a paracentesis, and afterward taking up the discharge by capillary drainage. A narrow strip (½ by 4 inches) of a good absorbent gauze is pushed with a probe through the disinfected speculum into the meatus until it touches the drumhead. The concavity of the auricle is then packed with bits of gauze until a thick pad is formed. When the discharge is very copious, a large absorbing cushion is required. It may be retained by a strip of adhesive plaster. The external pad should be renewed when it gets moist, which the properly instructed patient

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(1) Post Graduate, 1901.

can do himself. The strip in the meatus, however, should be changed only by the surgeon once in one or two days. As it is impossible to assure permanent sterility by asepsis alone, it is best to powder the gauze freely with a mixture of boric and salicylic acids (6 to 1).

To show the *value of early paracentesis,* J. E. Brown[1] reports a case of bilateral otitis with spontaneous perforation of one membrane and paracentesis of the other. Following paracentesis the discharge ceased and the perforation closed in two weeks, while in the ear with spontaneous perforation the discharge continued twice as long.

In doing a *paracentesis* for acute otitis media, Moure[2] uses equal parts of menthol, carbolic acid and cocain (Bonain's mixture), for anesthetizing the membrane, then makes a free incision in the anterior inferior quadrant.

J. F. McCaw[3] finds two varieties of *acute otitis media complicating influenza.* One comes on during the attack and while it may be severe there is little tendency to destruction of tissue and abortive treatment may be successful. The other variety is apt to occur during convalescence. The patient complains of an uncomfortable feeling in the ear, gradually changing to severe pain in from twelve to twenty-four hours. Examination usually reveals the membrana tympani moderately congested, no decided bulging, and, to all appearances, a mild case of otitis media. From this time on the character of the case changes; there is developed mastoid tenderness on deep pressure, or the slightest pressure over the tip, or it may be absent entirely. Bulging of the membrana flaccida becomes very pronounced, and the pain excruciating. There is in these cases an almost simultaneous invasion of the tympanum, antrum, and cells with the infectious and suppurative process, and their integrity is rapidly encroached upon. After incision of the membrana tympani, regardless of the thoroughness with which it is done there is a continued copious purulent discharge. The amount and rapidity of

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(1) **Columbus Med. Jour., May, 1901.**
(2) **Jour. de Med. de Bordeaux, May 14, 1901.**
(3) **Am. Jour. Med. Sci., Oct., 1901.**

pus formation is astounding. The incision fails to take on a reparative process, the lips remain open, pouting, and, in some, necrotic, the whole picture giving one the impression of a very active suppurative process in tissue of low vitality. Very few of this type of cases escape an active and rapid involvement of the mastoid.

In a recent epidemic of measles, S. Weiss[1] was able to *reduce the percentage of ear complications* from 27.8 to 6.6, by keeping the nose cleared of accumulations. The nostrils were swabbed back to the posterior pharyngeal wall with a 1 per cent ointment of yellow oxid of mercury. Another plan used was to fill the anterior naris with a pledget of cotton saturated with a 0.5 per cent solution of nitrate of silver. With the patient lying on his back the fluid was squeezed from the pledget by squeezing the sides of the nose together. The treatment was repeated as often as seemed necessary, usually four times a day.

Subacute Catarrhal Otitis Media. A. H. Alderton[2] calls attention to a form of catarrhal otitis in which a thick, tenacious mucous exudate forms in the ear. During the course of influenza or other form of cold the patient begins to have a full or stuffed-up feeling in one or both ears. Hearing is soon impaired but pain rarely becomes severe. On examining the ears the walls of the canal are found almost normal and the position of the membrane but slightly changed. There is slight redness of the malleal plexus. The membrane has a dull, lusterless appearance, but around its outer margin is a ring of congestion. While the middle ear cavity may be only partially filled no fluid line can be discerned. Functionally, the ear is very gravely involved. The watch is not heard or only on contact or very close to the ear. The whisper is heard for a very short distance, but the hearing for the spoken voice is relatively somewhat better. Bone conduction, for the Hartmann series of tuning forks, is normal or better. The lower tone limit is impaired, even up to C fork (128 d. v. s.), in cer-

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(1) Wien. med. Woch., Dec. 22, 1900.
(2) Med. News, Sept. 21, 1901.

tain cases. The upper tone limit is apparently very little, if at all affected. The intensity Rinne test shows negative (that is, initial BC is heard better than initial AC), in marked cases as high up the scale as the C^3 fork; rarely the C^4 fork may give an equal reaction. The duration Rinne is likewise negative for the lower forks. In a unilateral affection, Weber's test is positive.

Incision of the membrane and removal of the mucus is the only satisfactory treatment. Incision of the tympanic membrane alone sometimes gives exit to no secretion or only to a little teat-shaped projection, hardly visible through the hemorrhage from the cut edges. The drum membrane is often so thick and fibrous that considerable force is necessarily exerted in order to penetrate into the tympanum. But on forcible inflation the picture is changed. Then there appears in the canal a quantity of stringy tenacious mucus which follows the cotton on the applicator on its withdrawal from the canal as a long, filamentous string, for a distance of a number of inches from the external auditory orifice before it breaks. Often, in order to evacuate the drum cavity, it is necessary to inflate forcibly and repeatedly, assisting the extrusion of the mucus with the cotton applicator or with suction. After the removal of the exudate the hearing is greatly improved immediately and remains so until the incision heals and more mucus is formed. Should the exudate persist in reforming, a solution of silver, ½ to 1 grain to the ounce of distilled water, acts favorably, both injected into the Eustachian tube and instilled into the tympanum through the incision.

Chronic Nonsuppurative Otitis Media. A better understanding of the pathologic conditions responsible for progressive nonsuppurative deafness has led, in recent years, to more accurate diagnosis and more rational treatment; although much is yet to be accomplished before the result of treatment in many of these cases can be termed satisfactory. The work of Siebenman[1] has shown that many of

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(1) Arch. Otol., April-June, 1900, and Jour. Laryng. Rhin. and Ot., Oct., 1901.

the cases which have, in the past, been treated for catarrhal otitis media without results are really cases of diseased labyrinthine capsule (spongifying) and not amenable to treatment. The theory that sclerosis of the middle ear is a later stage of catarrhal deafness seems to have been largely superseded by the belief that the two conditions are separate and distinct, that they are due to different causes, and that the pathology of one bears little or no relation to the pathology of the other.

Chronic nonsuppurative catarrhal otitis media is due primarily to a diseased condition of the nasopharynx. The nasopharyngeal disturbance may affect the middle ear through its nerve supply, its blood supply, or through the Eustachian tube. When a nasopharyngeal inflammation extends into the tube by swelling of the mucous membrane lining it, certain changes take place in the middle ear which may be enumerated as follows: 1. Absorption of the air from the middle ear, causing rarefaction of the remaining air. 2. Retraction of the drum membrane from diminished air pressure within the middle ear. 3. Congestion of the blood vessels within the middle ear from diminished air pressure upon their walls. 4. After a sufficient time has elapsed proliferation of the connective tissue around the blood vessels and in their walls. 5. Later, contraction of this connective tissue which constricts the lumen of the blood vessels, lessens the blood supply and consequently lessens the nutrition. 6. Finally, atrophy of the mucous membrane lining the cavity and covering the structure within the middle ear. The deafness is due, first, to unequal air pressure on the two sides of the drum membrane interfering with its vibrations, and later, to changes in the articulations of the ossicles and in the tympanic muscles which regulate the tension of the ossicular chain.

In the treatment of catarrhal otitis media three objects should be kept in mind. 1. The removal of the nasopharyngeal cause. It will sometimes be found, however, that when an otitis media has been caused by a chronic nasopharyngitis the nasopharyngitis has recovered while the ear trouble goes steadily onward. 2. Restoration of the normal patency of the Eustachian tube. Late in the disease, however, the tube may be found abnormally patent, while its earlier occlusion was the cause of the pathologic process within the middle ear. 3. The restoration of the diseased parts of the middle ear as nearly as possible to their normal condition. When, however, the ossicular chain or the tympanic muscles are a hindrance to hearing, relief by surgical measures is to be considered.

The subject of nasopharyngeal abnormalities is considered under the Nose and Throat. When the Eustachian tube is closed by simple swelling of its lining membrane, successful treatment of the nasopharyngeal disturbances will usually relieve the tubal occlusion. When the tubal inflammation has passed beyond the simple stage, treatment must be directed toward the tube itself. Simple inflation of the middle ear by Politzer's or other methods, helps to relieve the congestion within the tube, while the introduction of sprays or vapors in connection with inflation increases its value. The injection of suitable fluid remedies through the Eustachian catheter has been found effective in many cases, while in some cases hypertrophy of the lining membrane or constricting bands have made mechanical dilation necessary.

Treatment. Among the procedures intended to relieve the pathologic conditions in the middle ear resulting from nasopharyngitis may be mentioned tympanic inflation, massage, superheated air, and electricity, while removal of certain parts of the middle ear is resorted to when these parts act as an obstruction to hearing or cause other distressing symptoms.

Massage. Schwabach[1] has used massage in 170 cases of chronic nonsuppurative deafness. The instrument used was the Breitung apparatus operated by the electric street current. The number of vibrations per minute was 600 in the beginning and gradually increased to 1,200. The dura-

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(1) Archiv. of Otol., Aug.-Oct., 1901.

tion of the seances was from one to three minutes. Among forty-three cases of sclerosis of the middle ear an improvement in hearing was obtained in 4.9 per cent of the cases in which the impairment of hearing had not yet reached a high degree, whereas, a permanent cure of the subjective noises occurred in 28.3 per cent. Essentially better were the conditions in simple chronic middle-ear catarrh; 39.1 per cent showed a permanent improvement in hearing, and 45.7 per cent showed an improvement in the subjective noises. Similar results were obtained in subacute middle-ear catarrh, *i. e.*, permanent improvement of both hardness of hearing and tinnitus in 44.4 per cent. Still more favorable were the results in cases of influenza, or cases which had recently recovered from an acute influenza midle-ear inflammation; 54.5 per cent showed an improvement of the subjective noises, and 66.6 per cent of the acuteness of hearing. Still more gratifying was the massage in the group of cases which showed the sequelæ of chronic suppuration of the middle ear; in 91.6 per cent there was either complete recovery or a notable improvement in the subjective noises, and unpleasant sensations; whereas the hearing power was essentially improved in only 55 per cent. In those cases where a precise diagnosis could not be made the results of the massage treatment were sufficiently good to justify further trial.

Schwabach expresses the opinion that vibratory massage is a valuable adjunct in certain affections of the middle ear and deserves to be tried, especially when the hitherto customary methods of treatment have proved insufficient. Further, that the vibratory massage does very little good in that form of chronic hardness of hearing for which it has been particularly recommended, namely, sclerosis of the sound-conducting apparatus. Above all he recommends the trial of pneumo-massage in patients suffering from subjective noises to such a degree as to render them unable to attend to their business. Vibratory massage is further to be recommended in cases of simple chronic hypertrophic middle-ear catarrh with dulness and retraction of the drumhead, and likewise in subacute middle-ear catarrh, in acute otitis media caused by influenza, and the sequelæ of chronic purulent otitis media where by customary treatment an improvement of the subjective noises and the power of hearing could not be obtained. In these cases particularly massage shows itself to be of essential value. It is justifiable to try massage in those cases in which a certain diagnosis could not be made as in them the subjective noises were improved in 40 per cent, and improvement in hearing in 5.7 per cent.

Ostman[1] has experimented with *massage* in order to determine what ear troubles might be improved by its use. In his series of cases were, (1) partial destruction of the conducting apparatus, (2) sclerosis, (3) hypertrophic forms of chronic nonsuppurative otitis media, (4) otitis media cicatricia. Improvement could be noted only in cases of hypertrophic nonsuppurative otitis media. Massage is contraindicated, (1) in all cases of acute inflammation of the sound conducting apparatus; (2) in all cases of sound perceiving apparatus when the conducting apparatus is normal; (3) in cases of chronic catarrhal otitis media when retraction of the malleus, atrophy and synechia of the drum membrane have taken place.

Superheated Air. G. W. Hopkins[2] has used superheated air in the treatment of chronic catarrhal deafness. The apparatus used (Fig. 14) is a simple room-heater, operated by gas or oil, and having a funnel-shaped top, which sends off the hot air through a canvas sleeve to the ear under treatment. The important points in the construction of the device are: 1. There must be sufficient draught to secure perfect combustion, without having an excessive draught, which wastes heat. 2. There must be at least one perforation in the canvas sleeve near the point of contact with the ear or the dead-air space present will prevent hot air from reaching the ear. A gauze packing within and over the ear takes up all moisture as rapidly as formed, preventing burning and making the application of very high temperatures easy and without discomfort. Although it is difficult to introduce currents of hot air to a cavity like the ear, which is open at only one end, if the above-mentioned precautions are observed no difficulty will be experienced.

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(1) Archiv. f. Orenheilk., Vol. 51, No. 1.
(2) Med. Record, June 12, 1901.

A case of chronic catarrhal deafness which was treated four years ago, is described as follows: The ear was thoroughly cleansed with alcohol for several days before treatment was instituted. The patient was then seated in a comfortable chair, the ear examined and found perfectly clean. Narrow strips of dry gauze were packed into the ear and a large pad of dry gauze placed over the ear. The ear was then covered with the canvas-sleeve hot-air conductor, and a current of air sent into the canal at a temperature which gradually attained 400° F. The tempera-

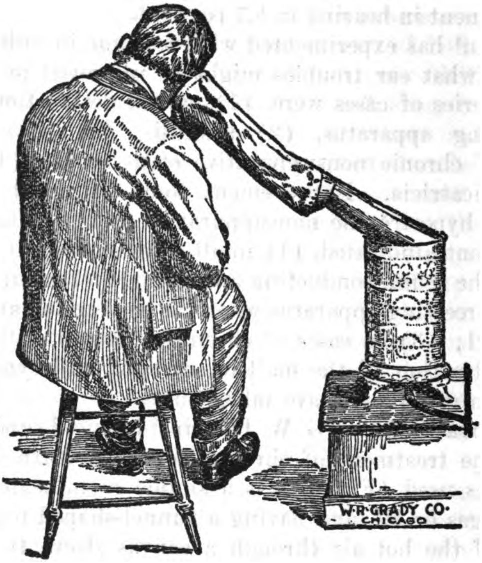

Fig. 14.

ture was easily borne, if gradually increased until a high point was reached, the only discomfort attending the treatment arising from a severe headache which always followed it, but which was promptly relieved by a dose of codein.

Following the hot-air treatment, the Eustachian tube was always inflated with a warm stimulating vapor from a nebulizer, vibratory massage with the nebulizer completing the treatment. The patient was not allowed to leave the office for a half-hour after treatment, and the ear was tightly packed with warm cotton before he went out. The nose and pharynx received appropriate treatment with antiseptic washes, etc. Treatments were continued on alternate days for three months, at the end of which time he could hear the watch tick distinctly at thirty-four inches, and surprised his friends by invariably replying to their whispered references to him. The right ear was then similarly treated, and in ten weeks an equally good result was secured. Examination showed that the ears were normal in appearance. The patient was discharged January 6, 1897, and careful tests made at frequent intervals since have shown no tendency to recurrence. During the four years subsequent to this experiment the writer has treated sixty-two characteristic cases of this disease with but four failures, and these occurred in very old people, all of whom had extensive labyrinthine involvement.

Electrolytic Dilation of the Eustachian Tube. Since A. B. Duell, in April, 1900, published the results of his experiments in the use of electricity in the treatment of Eustachian tubal occlusion, many others have followed his example and the result of their work forms the subject matter of a number of valuable papers. While the improvement in hearing has not been all that its earlier advocates expected, it is certainly a valuable adjunct to other methods of treatment, and in all cases in which the lumen of the tube remains restricted after the proper treatment of nasopharyngeal abnormalities the use of the electro-bougie should be employed.

C. P. Linhart[1] reports favorably on electrolysis as a factor in the treatment of chronic catarrhal otitis media. He finds the advantage of the electric bougie over the others, is that instead of merely stretching the tough, fibrous tissue, it dissolves and seems to have a stimulating effect upon the tissues, promoting their absorption. The chief use of electrolysis is to dilate the Eustachian tube for after-treatment by inflation and vaporization. The importance of this after-treatment cannot be too strongly emphasized. The progress of middle-ear catarrh, with its consequent thickening and displacement of the delicate structure of the middle ear, is always of long duration, and if the physician can assist in recovering to some extent, after two or three years treatment, that which has been destroyed by many years progress of the disease, he will have accomplished much. The least that can be said in the vast majority of these unfortunate cases, is that the progress of the disease may be stopped.

T. J. Harris[2] reports in detail his results in the use of the electro-bougie in the treatment of thirty-three cases of catarrhal deafness. His experiments were made at the Manhattan Eye and Ear Hospital and were undertaken principally for the purpose of determining correct answers to the following questions: 1. The value of electrolysis as compared with other methods of treatment in the relief of tinnitus due to middle-ear catarrh. 2. Its relative value in improving the hearing. 3. How permanently the stricture is relieved. 4. What dangers, if any, lie in its use. 5. What is the true nature of the process or phenomenon taking place.

In the thirty-three cases treated, twenty-six had tinnitus of a chronic nature (no acute cases). Of these twenty-six, one was cured, thirteen were improved, twelve were not improved. Seventeen of the thirty-three complained only of impaired hearing. Of these twelve were improved, five were not improved. In each case the modified street cur-

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(1) Columbus Med. Jour., July, 1901

(2) N. Y. Med. Jour., Aug. 3, 1901.

rent was used. The negative pole, not more than three milliamperes, was applied to the Eustachian tube for a period not to exceed five minutes. The bougie was introduced through a hard rubber Eustachian catheter or through a silver catheter insulated with thin rubber tissue. In every case the sign of "bubbling in the ear" was sought for, and no increase in the strength of the current was made after that point was reached. As little force as possible was used in advancing the bougie. With one or two exceptions the bougie was made to pass into the middle ear. The average length of the Eustachian tube was found to be one and one-half inches. In one case in which the bougie was passed only to this depth a marked traumatism of the middle ear occurred. Although care to secure as thorough asepsis as possible was continually exercised suppuration of the middle ear followed the treatment in four cases.

Harris feels warranted in drawing the following conclusions: 1. The electro-bougie has a place in our aural therapy—though a less important one than was at first supposed. 2. It should be used after, and not before, other methods of treatment. 3. It will be more liable to fail if any associated internal ear disease is present. 4. Its results are not always permanent—the stricture may re-form. Then we may hope rather for a diminution than a disappearance of the tinnitus. 5. Its use is not without danger—and a proper knowledge of the anatomy of the parts and of the technic is essential. 6. It is a question whether the process is a true electrolytic one, or if in many instances the obstruction is a true fibrous stricture. [The Editor would suggest that whenever a metal catheter is used the insulation should be tested by applying the current to the catheter before the bougie is inserted.]

J. A. Kenefick[1] states that *strictures of the Eustachian tube are the result of inflammatory processes* characterized in the beginning by hyperemia and stasis, vascular non-resolution, then migration of round cells into the resulting exudate, and lastly, the organization of the latter into fibrous connective tissue. They may also occur as a result of the sclerotic form of inflammation which is characterized by the formation of cicatricial tissue from the beginning. They may be the result of inflammatory processes extending into the tube from the pharynx or tympanum, or of processes occurring independently within the tube itself. The inflammatory deposit may occur at one or several points in the course of the tube. Owing to the vascularity of its lining at the tympanic orifice, the tube is particularly likely to be occluded at this point. This fact has been demonstrated frequently in the manipulation of the electric bougie.

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[1] Arch. of Otol., April, 1901.

The method of treatment used by Kenefick was that originally advocated by Duell. The instruments consist of an ordinary silver Eustachian catheter wound with rubber tissue for insulation. The bougie is of gold wire, with an olive tip one to two millimeters in diameter and of sufficient length to extend one-and-three-quarters inches beyond the catheter tip. The Edison 110-volt current is usually available for this purpose, but must be under perfect control, with a volt selector and a milliampere meter. The wire bougie is made the negative electrode, while the positive is the ordinary contact electrode held in the hand of the patient. With the catheter in good position, the bougie is passed through it into the Eustachian tube until the obstruction is met. Having selected the number of volts required, usually thirty to thirty-five, a current of one-half to three, four, or even five milliamperes is turned on, while the tip of the bougie is held firmly in contact with the obstruction. Within a fraction of a minute, usually, sometimes longer, according to the extent of the stricture, the bougie passes through and is felt free in the space beyond. This process may be repeated several times before the bougie enters the tympanum.

After reporting a number of cases in which the results of treatment were highly satisfactory he draws the following conclusions: 1. That it cannot be foretold exactly in any given case just what result will follow this treatment, as this will depend on two comparatively unknown quantities, viz., (*a*) the vascularity of the tube lining and its toleration of the mechanical and electrical interference, and (*b*) the degree of tympanic involvement. 2. That tubal obstruction is present early in the great majority of cases of so-called chronic hypertrophic catarrhal otitis media, and that progressive deafness, tinnitus, and vertigo, and many of the peculiar and distressing head symptoms may be purely mechanical, dependent upon closure of the tube by an organized obstruction, while the tympanum and its structures are as yet free or only slightly involved. Under the latter circumstances brilliant results may follow restoration of the tubes' patency. 3. That in any case where Eustachian obstruction has become organized the best means of disintegrating and causing its reabsorption is by the electrolytic bougie, which in rapidity, efficiency and permanency, excels all known methods.

Surgical Treatment of Chronic Non-Suppurative Otitis Media. Much difference of opinion exists among otologists as to the value of surgical treatment of chronic non-suppurative otitis media. C. H. Burnett[1] believes that the so-called catarrhal deafness must be regarded as an "affection of the nerves supplying the middle ear and correlated structures," that the deafness, tinnitus and dizziness are due to impaction of the footplate of the stapes in the oval window, and that the impaction is caused by contraction of the tensor tympani muscle. He thinks the best plan of treatment is to break up the ossicular chain and thus relieve the impaction. The majority of the symptoms indicate that neuroses of the trigeminus play the greatest part in the causation of this form of ear disease, though disturbances in the sympathetic innervation have much to answer for in the development of progressive deafness. Many of the phenomena of this disease indicate furthermore that complex disturbances in the correlated areas of the vagus, glossopharyngeus, facial, auricularis magnus

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(1) Phila. Med. Jour., Aug. 12, 1901.

and spinal accessory nerves also have much to do in the development of the aural malady under consideration. Hence many aural neuroses, *i. e.,* neuroses in the tract of the middle ear nerves, occur not as such alone, but must be regarded as standing in the closest relation to simultaneous and similar ones in the structures of the nasopharynx, fauces, larynx, and the opposite fellow ear. In the latter instance is seen an example of cross influence of one ear upon the other.

Subjective Symptoms. From such nervous lesions are developed a large series of the most dangerously insidious and progressive forms of deafness, tinnitus aurium and ear vertigo, or so-called Ménière's symptoms. Hardness of hearing and deafness are the prominent and earliest subjective symptoms in this disease, tinnitus aurium being the next, and aural vertigo the last symptom in the distressing list.

Objective Symptoms. Among the objective symptoms, the most prominent are the changes in the position and appearance of the membrana tympani and the ossicles. The drumhead becomes opaque, lusterless and retracted from contraction of the tensor muscle. The malleus handle, instead of being nearly vertical in position, is drawn backward and upward and appears foreshortened. In this process of retraction the membrana tympani is brought nearer the inner wall of the drum cavity, and in many instances the promontory of the cochlea, and the incus-stapes joint become visible through the membrana. These are the most important of the physical symptoms of progressive hardness of hearing, and in them can be seen the mechanism of progressive deafness.

The Ossicles. The immediate result of retraction of the membrane and malleus is retraction of the incus and stapes, with impaction of the latter bonelet in the oval window. Impaction of the stapes is all the more readily produced if the stapedius muscle is weakened by a lesion of the facial nerve from which the muscle obtains innervation. In a normal ear impaction of the stapes in the oval window and consequent compression of the labyrinthine fluid in the vestibule receives compensation by outward movement of the membrane of the round window. But in progressive hardness of hearing, changes occur in the membrane of the round window which render it stiff and unyielding to intra-labyrinth pressure, and its compensatory bulging outward toward the tympanic cavity is hindered or destroyed. Hence impaction of the stapes in progressive deafness is followed by disastrous pressure on the terminals of the auditory nerve in all parts of the labyrinth, resulting in deafness, tinnitus, and at last, in some instances, ear vertigo.

Operation. The patient should be etherized (local anesthesia by cocain being both inefficient and toxic) and the external auditory canal and the membrana sterilized by a solution of mercuric bichlorid (1 to 5,000) or one of formalin (1 to 1,000), or with alcohol. Then the auditory canal and the membrana tympani should be illuminated by means of an electric light held on the forehead and run by a small portable battery, made for the purpose of clinical illumination. When the membrana is intact, as it is in a case of chronic progressive deafness, the initial incision is made with a delicate knife, beginning close behind the short process of the malleus and following closely the periphery backward and downward until reaching a point below the line drawn horizontally through the umbo of the membrane. This cut is followed by little or no bleeding, as a rule. The flap thus made should be pushed inward towards the promontory by means of a probe armed with a small dossil of sterilized cotton. If there be no bleeding the incus-stapes joint is seen as soon as the flap of the membrana is pushed aside. If there be bleeding it must be mopped away with sterilized mops on a cotton holder. The incus being now in plain sight, it should be gently disarticulated from the stapes by drawing the former outwards and downwards by means of an incus-hook knife passed behind its long limb. When this is done the long limb of the incus should be grasped by special forceps and drawn very cautiously downward and outward into the auditory canal and then removed entirely from the ear. When this is accomplished the operation is finished. The slight bleeding that sometimes occurs in these cases requires no attention. The rest of the conductors of sound are left intact. The meatus should be stopped with sterilized cotton and the ear let alone for twenty-four or even forty-eight hours, unless the cotton in the meatus gets moist with blood or serum. If this occurs the cotton should be removed and dry cotton inserted. There is to be no after-treatment in such cases, as all is accomplished when the incus is removed.

As a rule, there is no reaction in these cases, and the wound in the membrana heals by first intention. Sometimes a slight reaction has occurred, shown by a little pain and some mucopurulent discharge. But this is healed in a few days by simply mopping the ear with sterilized cotton and a solution of formalin (1 to 1,000) and such reaction has never had any bad effect upon the result of the removal of the incus in checking the progress of the deafness. A serious reaction has not been encountered after any operation for incudectomy, and the patient is never obliged to remain in his room for more than twenty-four hours. The strongest claim Burnett makes for incudectomy is that after this operation the hearing does not follow the usual downward course either in the ear operated upon or in the opposite ear. He is fully convinced that the operation will not only check progressive deafness in the opposite ear, but will prevent its becoming involved.

Rhese[1] reports two cases in which *improvement followed in the opposite ear* after removal of the ossicles. It is probable that the removal of the malleus destroyed the synergic action of the tensor tympani muscle in the opposite ear and thus accounts for the improved hearing and arrest of the subjective noises. Another theory advanced to account for the improvement in the opposite ear is that

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(1) Deutsche med. Woch., No. 46, 1900.

by the anastomosis of the auditory nerves one with the other, inhibitory stimuli are transmitted through the tympanic plexus to the sound perceiving part of the other ear.

Chronic Suppurative Otitis Media. All cases of chronic suppurative otitis media, with the possible exception of tubercular otitis, were originally acute. The acute otitis media may have been at first catarrhal and become purulent by secondary infection, or it may have been originally due to the presence of infection in the middle ear and have been purulent from the beginning. In either case conditions have arisen which prevent recovery, and the discharge should be looked upon as a symptom of some pathologic condition within the ear and not as the disease itself.

The conditions which are usually responsible for the continuation of a discharge from the middle ear are: 1. Insufficient drainage. 2. The presence of granulations or polypi. 3. Necrosis. 4. Cholesteatoma. 5. Disease of the accessory cavities. Before making a prognosis or undertaking treatment a careful examination should be made to determine which of these conditions is present. When the perforation is large or the membrana tensa is absent simple inspection after cleansing will usually determine as to the presence of granulations or polypi. The bent probe should be used in searching for necrosis of bone in the middle ear, and for cholesteatoma.

S. MacCuen Smith[1] thinks that while the diagnosis of chronic suppurative otitis media is usually so self-evident that but little experience is required for its prompt recognition; yet the character of the discharge, the size and situation of the opening in the membrana tympani, the presence of pain or a rise of temperature, are all weighty factors in the general consideration and prognosis of a case of chronic otorrhea. A discharge of a ropy, mucoid character indicates that the Eustachian tube is chiefly involved, the swelling of its mucous lining preventing this thickened secretion from escaping into the nasopharynx.

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(1) Therap. Gaz., Feb., 1901.

Some disease or growth in the postnasal space is usually responsible for a discharge of this character. A copious discharge, creamy in character, indicates an involvement of the mastoid cells. This should be distinguished from the less abundant yellowish pus present when the tympanic cavity alone is the site of disease. The appearance of blood in chronic cases always indicates the presence of granulation tissue, which in turn is usually an outgrowth from carious bone. A discharge, not so profuse, brownish-yellow or greenish-brown in character, having a decidedly offensive odor, indicates extensive bone decay, involving frequently the tympanic attic and mastoid antrum.

Perforations may be situated in any part of the membrana tympani. A perforation situated in the upper part of the membrana tympani, especially the superior posterior quadrant (Shrapnell's membrane), is usually large in size, the ossicles and surrounding bony structures are liable to undergo necrotic changes, the deafness increases to a marked degree, and the discharge obstinately resists almost every therapeutic measure directed to its relief. In addition to this there is present a constant proneness to mastoid and brain complications, and to sinus thrombosis.

Surgical interference is necessary in most cases of this character whenever such manifestations become evident, and an operation on the middle ear, or the mastoid, or on both, should be performed in the early stages, even though the symptoms do not appear to demand such radical measures. The principal danger in such cases lies, therefore, not in the operation itself, but rather in its neglect. Great care should be exercised in the first examination. After the ear has been syringed with an antiseptic solution, the canal should be carefully dried with cotton twisted on an applicator; then with reflected light and an aural speculum the external canal, membrana tympani, and middle-ear cavity (when the membrane is ruptured) should be examined. Care should be taken to note the character of the discharge. the situation, size and number of perforations, and the presence or absence of granulation tissue or polypoid growths.

In the non-surgical treatment all seem to agree that cleanliness is of first importance. The different methods employed to secure this are: (*a*) cleansing the ear by the frequent use of the syringe and various antiseptic solutions; (*b*) the capillary drainage plan, in which no fluid is used in the ear, and (*c*) the combined method in which the ear is first cleansed by the use of the syringe or hydrogen peroxid, then dried and the drainage method employed.

The Syringe for Cleansing the Ear. Each writer has his own peculiar method of using the syringe and his own favorite solutions for use in the ear. When the discharge is profuse, J. F. McKernon[1] thinks the ear should be syringed and gives his plan as follows: The instrument used is a hard-rubber syringe with a blunt point or nozzle, holding an ounce of fluid. In the case of young children it is desirable that the syringe be of soft rubber, in order not to irritate the meatus or canal, and in shape should be like a round bulb, with a long drawn out point, through which the fluid passes on its way from the chamber of the syringe to the canal. In all adult cases the auricle should be grasped gently between the thumb and fingers of the left hand and drawn upward, backward, and a little outward, thus straightening the meatus and cartilaginous canal, and bringing it on a line with the osseous canal. Otherwise, when we use the syringe we shall be directing the stream of fluid against the side of the canal wall instead of directly into the lumen of the passage, as drawing the auricle in the manner described will overcome the irregularity at the opening of the canal and allow the nozzle of the syringe to pass into the meatus deeply, with its tip directed downward and forward. In syringing the ears of a child under 3 years of age, the auricle should be drawn outward and downward, as this position best aids us to overcome the natural curve of the canal at that age.

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(1) Med. News, May 25, 1901.

The frequency of the irrigation will depend largely upon the character and quantity of the discharge. At no time must the pus be allowed to accumulate to any extent in the auditory canal. In an ordinary adult case, it should be cleansed every three or four hours at first, and as the discharge begins to lessen, then diminish the frequency of the irrigation to three times a day, and later even to every second or third day. In a child it will be necessary to irrigate more frequently on account of the smallness of the canal and the tendency of the walls at the meatus to lie in contact, thus holding back the secretion. In these cases we should irrigate as frequently as every two hours until we notice a gradual lessening of the discharge, and from this point on diminish the frequency to three, four or six hours, depending upon the quantity of the discharge that presents itself each day. It is always well to bear in mind that an ear should be irrigated only frequently enough to keep the discharge from accumulating in the canal, as too frequent irrigation serves to soften, make flabby, and lessen the integrity of the parts, thus prolonging the disease. Only a small amount of force should be used in irrigating an ear, whether the case be a child or adult, and we should never use a cold solution, but one tepid, or slightly warmer, depending upon the amount of comfort given to the patient. The quantity to be used at each irrigation varies anywhere from a quarter of a pint to a pint. Rarely is it necessary at one sitting to use more than a pint.

If irrigation produces, as it sometimes does, disagreeable symptoms, as pain, vertigo, or nausea, and these persist, then no matter how profuse the existing discharge, we must cease the irrigation and remove the discharge by frequent mopping and cleansing with cotton. In all cases after irrigation, it is desirable to dry the deeper parts as well as the meatus with cotton.

The various solutions used for syringing the ear have been legion, but only those are mentioned which the writer has found of value from a clinical standpoint. A solution of bichlorid of mercury, in strength ranging from 1-2,000 to 1-5,000 in boiled water, is the solution most used, and the one from which we obtain the best results at the present time. A solution of value, and one largely used to-day by the general practitioner, is that of boric acid of the strength of 20 grains to an ounce of boiled water. As a cleansing solution it answers the purpose very well, but taken from a disinfecting or germicidal standpoint, it leaves much to be desired. A solution of carbolic acid in sterilized water of the strength of 1 or 2 per cent was formerly used. In obstinate cases, a weak solution of formaldehyde, 1-1,000, is often of service, owing to its active germicidal properties, but even in this strength it has to be discontinued many times, owing to its irritating qualities, and if continued should be used in a much weaker form. A solution of permanganate of potassium, half a dram of the liq. potass. permanganat. in from 4 to 6 ounces of sterilized water, is often used to abate the discharge, on account of its strong disinfecting properties, and at the same time it acts as an excellent deodorizer when we have a foul smelling discharge to treat.

If but little discharge be present, and the patient frequently seen by the surgeon, the existing discharge can easily be removed by mopping the parts with sterilized cotton, wound on a cotton-carrier. After the field has been gone over in this way it should be thoroughly cleansed with some comparatively strong nonirritating germicide or disinfectant, and one which the writer has found beneficial is the following:

Boric acid	gr.	20
Sol. hydrarg. bichlor. 1-1,000...........	dr.	2
Spir. vini rect. ad......................	oz.	1

The parts are thoroughly cleansed with this solution, and any granular surface is touched with a small cotton-tipped probe, dipped in silver nitrate, of a strength ranging from 20 to 240 grains to the ounce of distilled water. This will, in a large number of cases, so stimulate these structures, that by using such treatment two or three times a week, a cure will speedily follow.

S. MacCuen Smith recommends the following line of treatment. The ear should first be syringed, followed by the cleaning out of all secretions from the Eustachian tube by means of Politzer's inflation of the middle ear, or by Siegle's pneumatic speculum. In cases of more or less occlusion of the tube, it sometimes becomes necessary to resort to the Eustachian catheter or bougie. In the hands of those familiar with their use these appliances are most valuable, but great caution should be observed by all others. After the ear has been carefully dried, the head should rest on a table, with the affected ear uppermost, and a few drops of a solution of silver nitrate (gr. 1 to 3 to the ounce) instilled into the canal. It is desirable that the solution should pass through the Eustachian tube into the nasopharynx. When the tube is quite patulous this can be accomplished by directing the patient to open and close the mouth several times, or by the act of repeated swallowing. When this simple procedure does not succeed, it can usually be accomplished by exerting slight force with Siegle's pneumatic speculum, or in the following manner: Grasp the auricle and with traction draw it outward and forward; while thus extended, take the thumb of the opposite hand and close the external auditory canal by firm but gentle pressure on the tragus, immediately relaxing the hold on the auricle. This procedure may be repeated if necessary. Of course, this method of treatment should never be entrusted to the patient.

Syringing the ear should be practiced by the patient, once, twice, or thrice daily, being guided by the character and profuseness of the discharge. The instillation of the nitrate of silver drops, or other solutions, should be repeated two or three times in each week. The frequency of both syringing and the use of drops may be gradually lessened, according to the requirements of individual cases. Solutions of other drugs, such as copper sulphate, lead acetate, and zinc sulphate, may be used in the same strengths as the silver nitrate, but they should not be forced through the Eustachian tube. If it is necessary to employ stronger solutions these likewise should not be allowed to flow into the Eustachian tube, but should be applied directly to the tympanic cavity by means of a cotton-carrier.

In addition to the ordinary syringing of the middle ear, D. W. Aitken[1] uses a pledget of cotton in the auditory canal as a piston to pump the cleansing agent into and out of the middle ear and its accessory cavities. He describes the method as follows: The appliances required are a probe, some antiseptic lotion, and absorbent cotton. The first step is to pour some of the lotion into the ear. Then take as large a plug of wadding as is deemed sufficient when screwed upon the probe to easily fit the meatus. It is now possible to make the probe and ear canal a suction syringe. The plug of wadding which forms the piston is gently pushed in and then withdrawn. If it is found to be either too large or too small another can at once be substituted which acts easily and fits close enough to force some of the fluid before it. This fluid reaches the attic and also the mastoid recesses. At any rate, on the first withdrawal sufficient vacuum is produced to allow the lotion to enter the accessory cavities. It will surprise anyone who has not carried out this procedure to note how much discharge and debris are brought to the surface, even after syringing and swabbing have been efficiently performed. After several repetitions of the maneuver, the head each time being turned to the opposite side to permit of emptying the meatus, the lotion will well up clean. Now one can get any medicament to the clean surfaces. Begin with chinosol, iodoform, or amyloform in alcohol which is best in the absolute state. It is practically painless in almost all cases and in the exceptions the smarting is but momentary. Its advantages are: (*a*) it acts promptly upon the polypoid growths; (*b*) it is a most satisfactory antiseptic; and (*c*) as it evaporates it leaves a dry surface. This

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(1) Lancet, April 20, 1901.

is most important. When the solution has been poured into the ear the process with the "piston-rod" is repeated several times. Thus the fluid is forced into all the recesses. That this is so is seen by the prompt improvement both in the local conditions and also in the constitutional state. Of course, discretion is used as to the nature of the drug selected in the progress of the cure, according to the requirements—stimulant, astringent, etc.—of the case.

Although this treatment is quite prompt in its effects upon acute otorrhea its benefits are greatest in old-standing cases where the mastoid has become infected. Such cases have lasted for years; there is an abominable discharge, probably with polypoid growths, and if the more threatening head symptoms are not present there are the impaired health, the atonic dyspepsia, the anemia, and the loss of flesh to denote the dire effects upon the constitution which follow absorption. Many patients have been treated by this method and some have undoubtedly been saved from the somewhat serious operation of opening the mastoid.

In addition to other methods of cleansing the middle ear, P. J. Mink[1] passes a current of air through the Eustachian tube. The direction of the tube is such that the current sweeps across the attic to the antrum and dislodges products of suppuration more thoroughly than can possibly be done by a stream of water.

Excellent results from the use of *formalin solution in suppurations of the middle ear* are reported by N. G. Ward.[2] After thoroughly cleansing the ear, either by wiping away the pus or by syringing, the ear to be treated is turned upward and the middle ear and the canal is filled with a warm 1 per cent solution of formalin. This should remain for ten minutes and then be drained away. Ward recommends the use of this remedy twice a day by the patient. A stronger solution may be used when necessary, but as a rule a 1 per cent solution is better as then the use of cocain is unnecessary; and what is of still

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(1) Ann. des Mal. de l'Oreille, Jan., 1901.
(2) Jour. Am. Med. Assoc., June 15, 1901.

greater importance, the escharotic effects of the stronger solutions are avoided. Weak solutions increase cellular activity, which results in the casting off of the dead epithelium, stimulating the living cells to a healthier condition, re-establishing a more nearly normal secretion, toughening the cells of the middle ear to withstand exposure to the atmospheric changes, thus lessening the liability to continued infection through the external auditory canal. Conclusions. By the judicious use of formalin the following results may be obtained: 1. Fetid odor quickly disappears. 2. There is an early cessation of the discharge. 3. Protects against the formation of granulations, and small granulations destroyed by alcoholic solutions. 4. Promotes healing of ulcerated mucous membrane, skin abrasions, and inflammation of the external auditory canal. 5. Retards, but does not entirely check bone necrosis.

Capillary Drainage. Some otologists believe that when the patient can be kept under sufficiently close observation, or when the discharge is small in amount, better results are obtained by keeping the ear as dry as possible. When the perforation is large or the membrane absent, the middle ear is thoroughly wiped out with cotton on an applicator and the middle ear and canal carefully packed with a strip of sterile gauze. The object of the gauze is to absorb the moisture as fast as it is formed. The mucous surfaces of the middle ear are thus kept reasonably dry and in good condition for healing. The packing should be removed before it becomes saturated, and another dressing applied. When the discharge is profuse a pledget of cotton should be placed in the ear external to the gauze packing to take up any discharge that may pass through the gauze. The pledget may be changed by the patient or attendant as often as is necessary. It is claimed that when this method of treatment is properly carried out it most successfully combats the influence of the pyogenic germs which are the real cause of the suppuration. In the combined method the ear is cleansed by the syringing or peroxid of hydrogen, then thoroughly dried either by wiping out the fluid with cotton or by repeated instillations of alcohol. The alcohol mixes with the water that remains after the syringing. The fluid is drained away and the process repeated until only alcohol remains in the ear. The alcohol soon evaporates, leaving the ear practically dry. The ear is now packed with sterile gauze as previously described.

Aural Polypi. According to H. F. Waterhouse,[1] aural polypi are of three varieties—mucous, fibrous, and myxomatous. More than 80 per cent belong to the mucous variety. Practically all aural polypi originate in the mucous membrane of the middle ear and are due to chronic suppurative otitis media. When once developed they tend to aggravate the purulent process by increasing the pus and obstructing its exit from the middle ear. The pus is usually fetid and may be mingled with blood. At times neuralgic pains, tinnitus, giddiness, and attacks of vomiting occur. These symptoms are dependent, in large measure, upon the presence of a foreign body which offers an obstruction to the escape of pus from the middle ear. Removal of the polypus is of course the only treatment to be adopted, but it must also be considered at times a somewhat hazardous procedure. In certain cases in which the bony roof of the tympanum is eroded, or in which there exists a congenital perforation, the polypus may practically spring from the dura mater, and pyogenic organisms from the suppurating middle ear may thus gain access to the interior of the cranial cavity, causing septic meningitis and death. This has been known to occur at least four times. It is wise, therefore, to purify as far as possible the cavity of the tympanum prior to attempting the removal of the polypus.

The method recommended is the introduction into the ear, thrice daily, of a solution of biniodid of mercury, 1 to 3000 in rectified spirit, the affected ear being held uppermost for a few minutes. This solution, which for the treatment of purulent otitis media is invaluable, acts

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(1) Edinburgh Med. Jour.

partly as an antiseptic, which penetrates as it does not coagulate the albuminous discharges, and probably more importantly as a dehydrant, attracting the watery elements of the polypus, which is thus rendered paler and shrunken. This solution is even more valuable in the treatment of granulations. When the ear has been thus rendered as clean as possible, the polypus may be removed by cutting through its pedicle with a Wilde's snare, or by twisting with the Toynbee's forceps. It is most important to destroy the root of the polypus after the removal of the tumor, and this is best accomplished by touching it with the electric cautery, or with a tiny bead of chromic acid.

It cannot be too forcibly impressed upon the operator that so long as the polypus or granulation is intact, absorption is not likely to occur; but, when removed, absorption of pyogenic microörganisms may take place through the open mouths of the vessels in the root or base of the tumor, and lead to intracranial disease. To combat this danger, we rely on: (1) preliminary disinfection of the middle ear; (2) destruction of the raw absorbing surface left by the detachment of the polypus or granulation; and (3) the continued employment of the biniodid of mercury and spirit lotion, to prevent the recurrence of the polypi, by curing the purulent otitis media to which they owe their origin. For the removal of polypi, and, in fact, for most minor operations on the middle ear, almost complete anesthesia may be obtained by the instillation into the external auditory meatus of a few drops of a 10 per cent solution of cocain hydrochlorate in equal parts of anilin oil and rectified spirit. This valuable local anesthetic solution we owe to Dr. Gray of Glasgow.

G. Brühl[1] has made a careful study of aural polypi from a histologic standpoint. Usually aural polypi are divided into mucous and mucous-gland polypi, round-celled polypi, fibrous, myxomatous, fibro-myxomatous, angiomatous, angio-fibrous, and granulation polypi. All aural polypi are believed to be at first granulation tumors which later develop into other tumor forms. Schwartze recognizes two general varieties, aural polypi with epithelial covering, and polypoid granulations without epithelium. Brühl explains his method of staining and examining polypi and also gives his findings. He believes that polypoid granulations are not tumors, but are inflammatory tissue formations. Of the sixty polypi examined, forty-seven were polypoid granulations, eight fibromas, and five myxo-fibromas.

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(1) Archives of Otology, Aug.-Oct., 1901.

Cholesteatoma. J. Holinger[1] describes the formation of cholesteatoma resulting from middle-ear disease as follows:

First, the epidermis, especially in children, has a great power of regeneration, which is shown in all parts of the body where epidermis and mucous membrane meet. As soon as the mucous membrane is diseased, inflamed, or otherwise impaired, the epidermis grows over it and covers the spot. In this way insulas or parts of the normal epithelium are often overlapped and put out of existence. We find this at the nose, anus, etc. The process is especially energetic in the middle ear, as soon as the epidermization has once begun. The aditus ad antrum, the antrum and the cells become inundated with epidermis. Afterward this epidermis is under very unfavorable sanitary conditions. If in washing or in bathing, any water gets in such a cavity through the opening of the drum, it cannot evaporate, but will set up a certain amount of irritation, the epidermis forms more scales, and one cast after another of the wall is thrown off until the cavity is filled. But the process does not stop there, and here comes the second point: The cavity is enlarged by pressure, and some authors even think it has a tendency to active enlargement. The bone septa between the mastoid cells are destroyed or absorbed. The bone cannot resist in any direction. The most fortunate occurrence is a perforation into the external canal, or to the outside, and evacuation of the contents. Cases of this kind have been

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(1) Pacific Med. Jour., July, 1901.

repeatedly observed, where an extremely slowly developing growth appeared behind the ear or in the neighborhood of the mastoid process on the neck. The diagnosis is difficult until the tumor bursts and a big lump of dry scales is thrown out. This is, however, a most favorable, though rare, exception, the rule being perforation into the brain and death. The beginning of the growth usually dates back to the earliest childhood, and connection can often be established with one of those dreaded cases of scarlet fever otitis. The organism adapts itself to the pressure, and the slow growth may progress unnoticed for twenty or fifty years. Even parts of the labyrinth may be destroyed before a meningitis or sinus-thrombosis claims its victim at short notice.

According to H. J. Waring,[1] cholesteatomas of the temporal bone may be either primary or secondary in their origin. The first group comprises those cases in which the tumor is supposed to be derived from the epithelium of a cul-de-sac which extends from the lining membrane of the deeper portion of the external auditory canal towards the mastoid antrum and the tympanic cavity. A track or canal of this kind has been shown to be present in a small percentage of patients who have been examined from this point of view by Politzer and Schwartze. Another possible origin of a primary tumor is from a portion of surface epithelium which has become included during the process of development of the middle ear and external auditory meatus. The second group comprises those cases of cholesteatoma which develop in association with long-continued suppuration of the middle ear and partial destruction of the tympanic membrane. Squamous-celled epithelium then grows into the interior of the tympanic cavity through the aperture in the membrane, and covers the inner wall of this space. Thence it extends backward through the aperture in the posterior wall of the tympanic cavity to the interior of the mastoid antrum, the mastoid cells, or the attic of the tympanum. From a portion of

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(1) Edinburgh Med. Jour., Feb., 1901.

this ingrowing epithelium, by excessive and continued growth, a cholesteatomatous tumor may take its origin.

In operating for cholesteatoma, Waring makes a free post-auricular opening and after thoroughly cleansing, curetting and disinfecting the cavity, he fills the entire space with long, thin strips of bone and cartilage taken from the femur and tibia of a young kitten, which should be killed for the purpose during the course of the operation. The posterior wound is closed with sutures and the auditory canal packed with a strip of antiseptic gauze. After one operation performed in this manner the patient left the hospital in two weeks, and except a foul-smelling discharge from the external meatus from the fifth to the ninth day nothing of importance occurred. This patient was kept under observation for two years after the operation and at no time was there any indication of a reforming of the cholesteatoma.

Bony Defects. H. Gradle[1] has seen twenty cases in which an opening was found through the bony partition forming the outer wall of the attic and the upper part of the inner end of the auditory canal. The defect is usually a fissure of variable size in the external wall of the attic, opening through the upper wall of the meatus above Schrapnell's membrane. In some instances it seemed to be a fistula instead of a complete gap, but it is not always possible to distinguish between the two conditions. Small defects are difficult to recognize by sight and may be found only by the use of a probe. The end in the meatus is often narrower than the opening into the attic, which is in rare instances exposed to partial view. The membrana tympani was totally gone, or nearly so, in a few of the cases. In most of them the tense portion of the drumhead was intact and the perforation limited to Schrapnell's membrane. Most of the patients were seen on account of the discharge. Several, however, had no secretion at the time of the examination, merely asking help for their hearing.

The patients were all adults who dated their trouble

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(1) Jour. Am. Med. Assoc., March 20, 1901.

back to childhood. No case was observed from the beginning. The origin of the gap in the bone must, of course, be attributed to caries, but no evidence of its continuance was found in most of the patients. The existence of a fistula into the attic does not add to the gravity of a chronic case. In view of the fact that these were all cases of disease of the attic, their course may even be said to have been relatively mild, perhaps on account of better drainage. One time only were distressing symptoms—vertigo and headache—observed during a subacute exacerbation. Of twenty patients, nineteen were cured without any operation, some remaining under observation many months, others several years. Relapse, however, must be expected in some of these cases, and indeed about one-third of them did return, sometimes repeatedly—after intervals of months or years. The relapses were as easily checked as the previous continuous disease. A frequent cause of relapse was desquamation of the epidermis, which had grown through the fissure into the attic. Cholesteatomatous contents were found in six patients, often in the form of concretions, which could be picked out in a single mass. This process of desquamation continues after suppuration is arrested. Several patients have returned once in one to three years, presenting again the concretion in the attic, but without symptoms or odor. In none of the cases was there any reason to suspect that the desquamative process extended beyond the attic.

MASTOID DISEASE.

The prevention and treatment of the complications arising from suppuration of the middle ear is a subject which occupies a very prominent place in the domain of otology. That progress has been made along this line in recent years is proven by the fact that many patients are saved now who would formerly have been allowed to die without rational attempt to save them. That much is yet to be learned on these subjects no one can doubt. Formerly much was said about the non-operative treatment of mastoid disease, and about Wilde's incision, some even going so far as to resort to more radical operations only in extreme cases, and after all other measures had failed. Of late the relation of mastoid disease to the patient's material interests is better understood and the result is a large increase in the number of mastoid operations. Several writers have attempted to formulate rules for the guidance of the inexperienced in determining the necessity of surgical intervention in mastoid disease resulting from suppurative otitis media. That this is a difficult undertaking all will agree, for it is well known that in many cases the symptoms either subjective or objective bear little relation to the pathologic conditions within the mastoid process. In some cases, when the subjective symptoms have pointed toward some grave lesion, apparently slight pathologic changes have been found, while in other cases the symptoms have hardly seemed to justify any radical procedure and yet operation has revealed conditions which proved conclusively that the patient could not have recovered under less radical treatment. In many of the apparently mild cases the patient's life is found to be in immediate danger. The old statement that pus travels in the direction of least resistance is especially true in mastoid disease, and it is equally true that the greater the external symptoms the less danger of brain complications. The relative thickness and density of the inner table as compared with the other borders of the mastoid, no doubt accounts for the difference between the external symptoms and the danger to life. When the sinus becomes involved the infection has traveled from the ear through the venous channels. When pus accumulates in the middle ear, attic or mastoid, it is beyond the power of the surgeon to foretell the occurrence or to estimate the liability of sinus disease in any given case. Even when the perforation is large and the opportunity for drainage is abundant, the disease may spread to the intracranial structures. Three elements enter largely into the question of extension: (*a*) the character and virulence of the infection; (*b*) the anatomic arrangement of the parts; and (*c*) the patient's resisting power. Extension of the pathologic process may occur either by erosion of bone in continuity, or by escape of infectious material from the middle ear through the blood vessels, by apertures in the bone, or by the lymphatics. When there is conclusive evidence of disease in the mastoid, otologists are pretty well agreed that the best way to relieve the local conditions as well as to obviate the danger of extension to more important structures is a thorough removal of the diseased tissue.

Diagnosis. In discussing the subject of diagnosis, E. B. Dench[1] states that the most prominent symptom of mastoiditis in adults is *pain in the region of the mastoid.* This may be accompanied by a very profuse discharge from the ear; or the discharge from the ear, which has been previously profuse, may suddenly become diminished, and this diminution in the discharge may be followed by a marked exacerbation of the pain. While pain is a very marked symptom, it may not be excruciating. In phlegmatic individuals the pain is frequently not described as severe; the patient will simply pass sleepless nights, and on being questioned it will be found that the sleeplessness has been caused by pain in the head. Prostration is also a symptom to be borne in mind. It is impossible to have any considerable collection of pus within the pneumatic spaces of the mastoid without having the patient suffer more or less severely from prostration. The temperature is probably the least important guide in making the diagnosis. In some cases in adults, which have been under observation, it has been found that the temperature was absolutely normal for a long period of time. In one case in particular the temperature observations were made every three hours for a period of two weeks. During this time the temperature never rose above the normal standard, yet on opening the mastoid the entire cellular structure was found to be

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(1) Jour. Am. Med. Assoc., July 27, 1901.

broken down, and the resulting cavity filled with foul pus. If fever is present, it is an aid in diagnosis, and renders the presence of a purulent collection within the mastoid process probable; if absent, it does not exclude the possibility of a severe suppurative process existing within the bone. In children, an involvement of the mastoid process, either following an acute inflammation of the middle ear or following an acute exacerbation of a chronic suppurative process, is always attended by a rise of temperature. This rise of temperature, especially in young children, may be considerable, the temperature frequently reaching 103° or 104° F., or even 105°. It is also noticeable that in child life, symptoms of general sepsis develop quite early as a result of mastoid suppuration. While in adults it is rather uncommon to observe a septic curve in the temperature, excepting in those cases which have been long neglected, and where all the signs are very well pronounced, it is quite common in children to find evidence of septic absorption within the first twenty-four or forty-eight hours after mastoid involvement is suspected. Temperature, then, in children, is a valuable point in making a diagnosis of mastoid involvement; in adults, it is of little value, and the absence of fever should never be taken as an indication that the mastoid is not involved.

Auscultation of the Mastoid. In searching for signs of mastoid involvement either in acute or chronic otitis, before external objective symptoms have occurred, the Editor[1] has found the stethoscope and tuning-fork of decided value. The examination of the mastoid is made by placing a stethoscope with a small bell, over the tip and placing the handle of a vibrating tuning-fork against the mastoid in the neighborhood of the antrum. It is found that when the mastoid cells are filled with pus or granulations, or when the density is increased from bone proliferation, the sound waves are transmitted to the ears of the examiner with greater intensity and for a longer time

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(1) Laryngoscope, June, 1901.

than when the stethoscope and tuning-fork are placed in the same relative position over the opposite or a normal mastoid.

In making the test no traction should be made upon the soft tissues, for if the skin is stretched or if it is pinched between the stethoscope and the handle of the fork the sound will be unduly increased. The stethoscope used has flexible tubes and a metal bell five-eighths of an inch in diameter. The fork which has given the best results is the $C^2$512. In a considerable number of cases examination by this method has shown increased resonance of the mastoid when there were no other local objective symptoms, and later, the conditions found in operating have proved the reliability of the test.

Indications for Operations. J. H. Woodward[1] gives seven objective indications for the mastoid operation:

1. Bulging of Shrapnell's membrane, with swelling at the inner extremity of the auditory canal. The upper posterior quadrant of the membrana tympani is known as Shrapnell's membrane. Whenever, in purulent otitis media, it bulges into the auditory canal, and especially if swelling at the inner extremity of that canal be associated with it, we may assume that the mastoid antrum is seriously involved, and that the radical operation will probably be necessary to the patient's recovery.

2. Persistent tenderness over the mastoid process. Persistent tenderness over the mastoid process is a symptom of an otitis having important proportions. It is an indication for the radical operation, in both acute and chronic otitis media. In some such cases we find very little pus. In purulent otitis media the mucous membrane of the middle ear is in a state of fungous granulation, we find caries of the bony walls of the middle ear. Both of these pathologic conditions are incited by infective microörganisms, and in both the existence of pus may not be very evident on cursory examination. Nevertheless, in order to cure such states of mucous membrane, and to check the

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(1) Jour. Am. Med. Assoc., Feb. 2, 1901.

progress of the caries, and to remove the infective organisms from the chamber of the middle ear, an operation that penetrates to and eradicates all of the disease must be undertaken. We should not expect other methods to succeed. Our duty to operate, therefore, is quite as great before an abscess has formed as it is afterward.

3. Swelling of the soft parts over the mastoid process. The mastoid antrum should be opened in suppuration of an ear whenever swelling of the tissues over the mastoid process is observed. In a certain percentage of cases, incision and drainage of the superficial abscess is followed by recovery. Some of these patients are restored to health after a longer or a shorter period; but in many of them the radical operation must be done before the patient recovers. It is especially important that the radical operation be performed early in cases of chronic suppuration of the ear with swelling over the mastoid. Subsidence of the swelling in such cases can never signify that an adequate impression has been made on the disease, unless the improvement has been brought about by measures that are distinctly more effective than the usual local treatment.

4. Granulations and fistulæ in the auditory canal external to the drum-head are indicative of caries in the walls of the middle ear. The discharge in these cases is more or less offensive. The extent of the carious process is not indicated by the objective, much less by the subjective symptoms. And no plan of treatment less heroic than a thorough mastoid operation offers any prospect of recovery.

5. Persistent and relapsing fistulæ behind the auricle. Persistent and relapsing fistulæ behind the auricle should be cured by a radical operation. They point to the existence of caries of the walls, and an infected state of the mucous lining of the tympanum, antrum and cells. Fistulæ that discharge for a time and close for a period are perhaps more likely to be followed by sinus-thrombosis, or some other intracranial mischief of a dangerous character

than are others that remain open continuously. The indications for early operation seem clear.

6. Persistent, and especially offensive, otorrhea. Persistent and relapsing otorrhea, especially if offensive, ought to be checked by thorough removal of the underlying infective condition of the middle ear. Failure to cure otorrhea by the radical operation will be observed rarely, if the work is done thoroughly, and if the wound is kept surgically clean until complete healing has taken place. There may be cases of purulent otitis media that are incurable. There are cases that will not yield to one operation, because all of the disease and all of the infective material may not be removed at the first attempt. The cases that prove to be incurable, and those that prove to be difficult, are either cases in which the infection has eaten its way slowly along for years without any very marked outbreaks, like a smoldering fire in the forest, or they are cases in which the infection is intense, and the attendant indifferent to the dangers of delaying operative intervention.

7. Sudden marked diminution, or absolute cessation, of a chronic otorrhea is a symptom of great significance. It should be regarded as the signal that the infection has attacked, or is about to attack, a vulnerable part. It is a command to operate in the most thorough manner, and with the least possible delay. In such cases the sigmoid sinus ought always to be explored.

G. Bacon[1] finds that cases of mastoid disease occurring in connection with chronic purulent otitis media almost always require operation. The outer cortex is usually very dense and the antrum is apt to be filled with cholesteatomatous material. Unless operative measures are adopted in most instances there is great danger of some intracranial complication. It is always advisable to examine the pus from the tympanum, under the microscope, and have cultures made, for much information can be obtained in this way, not only as to the probable severity

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(1) Archives of Otology, June, 1901.

of the disease, but also as to the prognosis. When the infection is due to the presence of either streptococci or pneumococci in large numbers, the disease is apt to run a severe course, and frequently, in spite of all treatment, the mastoid cells have to be opened.

If, after incising the drumhead and applying the Leiter coil, and if, after the appearance of a profuse discharge, the temperature still remains elevated, the surgeon may be very certain, provided the mastoid is still tender, that the case is likely to require an immediate operation. For otherwise the inflammation may in a very few days extend to the sigmoid sinus or to the dura through the tympanic roof. This is likely to occur in the case of children, especially when the infection is due to the presence of the streptococcus or pneumococcus. Such children have a temperature of 104° to 105° F., a rapid pulse, complain of but little pain, and lie in a semi-dazed or stupid state, and seem to be very ill. When the pneumococcus is found in the discharge from the ear, the lungs should be examined, because an elevated temperature in such a case may be due to a central pneumonia, which is not always detected at once.

In addition to other symptoms indicating the necessity for opening the mastoid, E. B. Gleason[1] attaches great importance to continued *tenderness to pressure on the tip of the mastoid.* When a destructive process is going on in the tip some of the otherwise reliable symptoms, such as swelling and tenderness of the upper posterior wall of the meatus, are not seen. When caries occurs in the bony wall separating the large cells in the tip from the smaller cells above there will often be sufficient drainage through the antrum and middle ear and hence no swelling of the wall of the meatus. Under such circumstances Gleason has several times found the mastoid process one large pus cavity, all evidences of cell structure having disappeared. Access to the antrum and tympanum was secured only by scraping away granulation tissue and intervening bone.

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(1) Internat. Med. Mag., Aug., 1901.

These so-called mastoid tip cases are dangerous if neglected, because the pus, instead of finally penetrating the external cortex, may find its way through the inner surface of the tip to the digastric fossa and thence beneath the skull or behind the muscles of the neck into the chest. Some of the older writers detail cases of lingering tortures and final death in cases of this kind. In one instance, necrosis of the cervical vertebræ occurred, with general paralysis from partial dislocation and pressure on the spinal cord. Death suddenly occurred while attempting to move the patient in his bed.

In neglected cases of mastoid suppuration the external cortex is generally sooner or later perforated. An effusion takes place beneath the mastoid periosteum which is dissected up from the bone. If now the patient's head is viewed from behind the affected auricle is seen to project from the side of the head to a greater distance than its fellow. Later on the pus penetrates the periosteum and gravitates into cellular tissues of the neck, immediately beneath the skin. Under such circumstances, pressure upon the superficial abscess causes pus to flow through the mastoid process, the middle ear and finally to escape from the meatus.

Tenderness on pressure over the mastoid process in unfavorable cases is soon succeeded by pain, which usually extends over the entire side of the head and is sufficiently severe at night to prevent sleep. The tongue is coated and the appetite suppressed. The patient eats little and sleeps less. His temperature may reach 102°, although in some cases it is nearly normal. The face after some days assumes an expression of anxiety and suffering. The torture is evidently extreme, principally perhaps because it is long continued. Some of these cases will progress to a favorable termination as the result of judicious treatment, but only after long-continued suffering. It would seem judicious, therefore, if pain be not relieved by a week or two of treatment, to make an "exploratory incision" or to open down to the mastoid antrum; an operation that, in skilled hands, can do no harm. So unreliable are all symptoms of caries of the mastoid process, that the operator may find the mastoid process a large pus cavity, or may chisel through apparently normal bone until in the neighborhood of the antrum, where the bone in such cases usually is found red and soft. In either case the operation is followed at once by an entire cessation of pain and otorrhea, and the usual ultimate result is practically normal hearing.

In acute otitis media with mastoid involvement, E. B. Dench[1] is *strongly in favor of early operation.* Abortive treatment should be limited to those cases seen in the earliest stage, and in which there is simply a fear that mastoid involvement may occur. When there is well-marked mastoid tenderness, and when there is narrowing of the meatus, it is unwise to attempt to abort the inflammation by the local application of cold or by the local abstraction of blood. It is much better to keep the patient perfectly at rest and under observation for a day or two without the use of any abortive measures than to mask the symptoms by external applications. If at the end of twenty-four or forty-eight hours the condition is not changed, the surgeon is certainly warranted in operating upon the mastoid process. An exploratory operation in this region is certainly as justifiable as exploratory laparotomy. At the present day, the surgeon does not wait until he is absolutely certain that a case of appendicitis will not recover without operation; he does not delay until the patient is in a desperate condition, but by early operation prevents the patient's condition from becoming serious. The aural surgeon should adopt exactly the same rules. If a case is doubtful he is fully justified in doing an exploratory operation. If nothing is found, no damage is done. If this rule is observed many lives will be saved which will be lost if the abortive plan of treatment is followed.

Operation. E. B. Dench[2] believes that a large opening

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(1) Med. News, July 6, 1901.
(2) Med. News, July 6, 1901.

in the bone is of great importance in mastoid operations, and that strict attention to asepsis should be exercised. If the opening in the mastoid has been large and the aseptic technic has been perfect the accidental wounding of the sinus is not a serious matter; the hemorrhage can be controlled by pressure applied with a pad of gauze held by the assistant, and the surgeon can proceed with the operation. If, on the other hand, a small opening is made in the mastoid, and the sinus is accidentally entered, it is impossible to finish the operation and at the same time control the hemorrhage. Again, it should be remembered that, even in cases in which there seems, on examination, to be slight mastoid involvement, the inflammatory process may have been so extensive as to have already invaded the lateral sinus, or to have caused a localized infection of the meninges. Under perfect surgical technic the discovery of such a condition enables the surgeon to immediately relieve the patient, while, on the other hand, if the operation is conducted carelessly, the intracranial involvement must be a very serious matter. The possibility of intracranial involvement in even the most acute cases is certainly an argument for thorough and complete operation in every instance. Another reason for making the operation extensive is that the large opening in the bone enables one to determine whether or not any intracranial inflammation is actually present. All softened bone is removed, and each area of softening is followed until firm bone is reached. If this is done, there is no possibility of the surgeon overlooking an extension of the infection to the intracranial structures. If, on the other hand, a small opening is made, and softened bone simply curetted out through this, the parts are not under immediate inspection, and an extension of the inflammation may be overlooked.

The topography of the mastoid varies so greatly in different individuals that unless the large opening is made it is impossible for the operator to thoroughly remove every focus of infection without running the risk of invading some important region, such as accidentally entering the middle fossa or the unintentional opening of the lateral sinus. The possibility of such an accident renders strict attention to aseptic technic absolutely necessary. While it is usually possible for the operator to avoid the accidental opening of the lateral sinus, and while he will seldom enter the middle cranial fossa without intending to do so, such accidents may occur to the most skillful operator.

In all cases the mastoid antrum should be opened and free communication with the middle ear established.

O. Lenoir[1] first opens the antrum and then extends the operation in the different directions as the conditions indicate.

R. Lake[2] believes that after the radical mastoid operation the *posterior meatal flap should be removed,* because after it has been turned back to line the roof of the operation cavity, as is usual, the ceruminous glands in the flap continue to functionate, and the cerumen produced is unable to escape. Deafness occurring a considerable time after such operations is often due to an accumulation in

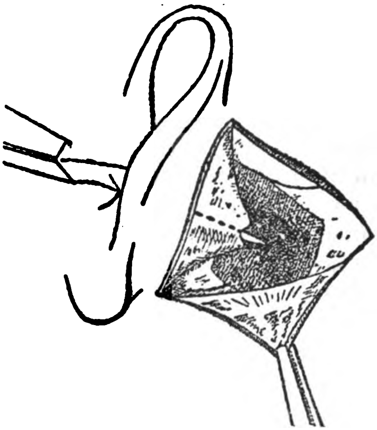

Fig. 15.

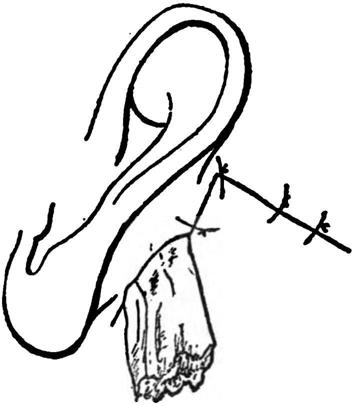

Fig. 16.

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(1) Rev. de Chirurgie, Oct., 1901.
(2) Jour. Laryng., Rhin., Ot., March, 1901.

the mastoid cavity. The delayed appearance of the deafness may be due in part to the large cavity there is left to fill and in part to the inactivity of the glands for some time after the operation.

The postauricular incision, as usually made, is from a quarter to a half inch behind the attachment of the auricle, and extends from the tip of the mastoid to a point above the auditory meatus. G. Marion[1] carries the first incision but little above the level of the meatus, but makes another at right angles to it, as shown in Figs. 15 and 16.

Mastoid Operation Under Local Anesthesia. G. Alexander reports eleven cases of mastoid operation performed in Politzer's clinic under cocain anesthesia. General narcosis was contraindicated for various reasons, such as nephritis, anemia, pleuritis or pregnancy. The amount of cocain used in each case varied from .07 to .14 gm. Each step of the operation was preceded by the thorough infiltration of the tissue down to the bone. Little absorption of the cocain is supposed to have occurred because of the free hemorrhage. No attempt was made to anesthetize the deeper structures except when the granulations or the endosteum were sensitive. All the cases except one were able to remain quiet during the operation. While the analgesia is not absolute, Alexander thinks the plan possesses advantages which in some cases are so marked that he recommends the methods in all cases where the confidence and coöperation of the patient can be secured. In five of the cases reported the patient suffered no pain either during or after the operation and had a good appetite for the next meal. The other cases experienced a moderate amount of pain in the head or wound.

Non-Operative Treatment of Mastoiditis. G. Bacon[2] has treated forty cases of acute purulent otitis media complicated with acute inflammation of the mastoid cells and found it necessary to do a mastoid operation in but ten cases. In two of these ten operations a subsequent opera-

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(1) Semaine med., Aug. 21, 1901.
(2) Archives of Otol., Feb., 1901.

tion for sinus thrombosis was performed. Of these latter cases—sinus thrombosis—one terminated fatally. This was the only death in the forty cases. In thirty cases, or 75 per cent, the mastoid cells were not opened. Of these forty patients the ages varied from 6 to 65 years. There were twenty children under 15 years of age. Of the twenty children sixteen were males and four females. Of the remaining twenty adults, ten were males and ten females.

The general plan of treatment which Bacon follows in acute purulent otitis media, especially when complicated by acute inflammation, is as follows:

Leeches. A great many cases of mastoid disease can be cut short in the first stage if, instead of administering opiates to relieve the pain, or perhaps phenacetin or quinin to reduce the temperature, which is very often high in the case of young children, we apply leeches at once. When the patient is seen at the outset of the attack, leeches should be applied just in front of the tragus, if the middle ear is involved. If mastoid tenderness exists, a leech should be applied behind the auricle, over the antrum, or the lower portion of the mastoid process. The artificial leech, consisting of a scarificator and cupping glass, is to be preferred to the natural leech because it is always on hand, while natural leeches are frequently very difficult to obtain, especially at night. Most persons, besides, have a great dislike to leeches, and frequently the hemorrhage from a leech bite is very difficult to control. Instances have been reported in which almost fatal hemorrhage has resulted from the use of natural leeches.

Medicinal. The patient in the first stages should be put to bed and given very light diet, especially when there is much fever. Calomel should be administered in 1-10-gr. tablets—one every hour for six doses, or until a laxative effect has been produced. Tincture of aconite in one-drop doses is also an excellent remedy in the early stages.

Cold. If the mastoid process is tender on pressure, and the inflammation of the cells has followed an acute otitis media, the Leiter coil should be applied (after having first used the artificial leech), and the cold should be kept up for at least forty-eight hours. The use of the artificial leech and the application of cold will often shorten the attack. The coil will frequently relieve the pain at once, but should not be left on longer than forty-eight hours for fear of masking other important symptoms.

Paracentesis. In the meantime the condition of the drumhead should be watched with such care that as soon as there is any bulging a free incision may be made in the membrane along its posterior border, from a point behind and below the stapes to the lower border of the drumhead, and close to the bony canal. In all cases of scarlet fever, measles, diphtheria, influenza, and especially when the infection is due to the streptococcus or pneumococcus, it is advisable to make an early incision in the drumhead, even if the latter is not bulging, especially when there is acute inflammation of the mastoid cells and the patient has considerable fever. After having incised the membrana tympani, the object of treatment should be, first, to promote the discharge. This is best accomplished by douching the ear frequently with a warm boric-acid solution (boric acid dr. 1, water oz. viii), or a bichlorid solution (1:1000). Secondly, we should try to destroy the micro-organisms. Frequently when spontaneous rupture has taken place, the perforation is so small that the opening should be enlarged. The size of the opening is most important, for the successful outcome of the case depends on a *free incision* having been made. In some cases, after incising the membrana tympani, the surgeon will be disappointed to find that only a slight bloody serous discharge escapes. Usually, however, within twenty-four hours this will be followed by a profuse discharge, and a fall in the temperature.

This conservative line of treatment should never be followed out except by one who has had considerable experience in aural diseases, and can recognize very early the more serious symptoms which would decide the surgeon to open the mastoid cells. The aural surgeon should be in close touch with the patient, and if he does not see him each day, he should be in a position to know his exact condition so that he can operate at a moment's notice in case of necessity.

The aural surgeon should do all in his power to cure his patient without opening the mastoid cells. If, however, the latter operation becomes necessary, he should not hesitate for a moment not only to remove all diseased tissues from the mastoid antrum to the tip, but he should be fully competent and prepared to operate at all times on any intracranial complication.

The statistics of 100 successive mastoid operations in the New York Eye and Ear Infirmary are presented by E. W. Pyle.(1) Eleven of the cases were radical operations, the apophysis, posterior wall, and ossicular remnants being removed (seven in adults, four in children). Nine of these gave evidences of cholesteatoma, showing the relative frequency of this complication in chronic cases. Twenty-two were extradural abscesses: six in children, following exanthemata; sixteen in adults, due to chronic influences. Five had sinus thrombosis (one adult, two adolescents, two children, ages 4 and 6 years), youth having the preponderance, which is against the rule. In nineteen cases the middle fossa was exposed. In thirty the sinus was uncovered; twenty-four by erosion, three by accident, three intentionally. No meningeal irritation followed these exposures. As asepsis could not be perfect from the very nature of purulent wounds, the inference is that the dura possesses a resisting power to pathogenic invasions greater than most protecting membranes.

Incisions, Dressings, etc. Excepting in the Stacke operations, the integument was invariably incised at right angles to the primary incision, on a level with the center of the external meatus, extending posteriorly one inch. This relieved tissue stress consequent upon retraction, facilitated operation by good exposure, and invariably healed by primary union. Iodoform gauze was used in all first dressings, and discontinued thereafter for the plain sterilized variety, unless there were special reasons for stimulating granulations. In the radical operations the dressings were made mostly through the canal, and at the earliest possible date the auricle was pressed toward the head, to favor posterior healing and to relieve deformity. As soon as granulations would permit, dermatization was hastened by discarding gauzes, dusting with xeroform and admitting air freely.

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(1) Arch. of Otol., June, 1901.

Transfusions. The life-giving impetus of the hot normal-saline solution was manifested in four cases. They were administered through the median cephalic vein at a temperature, in the reservoir, varying from 110° to 125°. The most marked reaction followed the transfusion of thirty-two ounces at the last temperature. Experiments have proved that hemoglobin is not coagulated under 140°.

Conclusions. The children, numerically four less than the adults, furnished three times as many acute cases; the adults three times as many chronic cases as the children; illustrating that the greater number of mastoid inflammations, sooner or later, demand surgical interference. Thirty-seven cases of subperiosteal accumulations and eleven adults giving evidence of having had cortical perforations, show clearly the insufficient efforts nature had made to repair, as they had finally to yield to operative necessities. Forty-five acute cases furnished 33 per cent of the intracranial complications, mostly in children, and all lived. Fifty-five chronic cases furnished 66 per cent of the intracranial complications, of which four died; illustrating the value of normal periosteums and phagocytic properties of white corpuscles to resist pathogenic invasion and emphasizing the importance of prophylactic treatment. Four cases were operated upon, perhaps too early and ill-advisedly, but beyond the possibility of a doubt, ninety-six would have been vastly benefited by earlier operative procedure.

Prognosis as to Hearing. The question of how a mastoid operation will affect the hearing sometimes becomes important. Grossman[1] has investigated this subject and finds: 1. In cases in which the labyrinth is not diseased improvement may be expected, especially if the impairment before the operation has been considerable. 2. When functional tests show that the perceptive apparatus has become involved, improvement cannot be expected. In 45.9 per cent of the cases hearing remained the same; in 38.8 per cent of the cases it improved, while in 15.3 per cent it diminished.

Hysteric Mastoiditis. G. Liaras[2] reports five cases of hysteric mastoiditis. In some there was or had been ear disease, but the pain in the mastoid was out of proportion to the objective symptoms. The pain, as a rule, was general, constant, not radiating but extending over the entire mastoid. The fever and prostration usually attending mastoiditis were, of course, absent. Such ailments yield to suggestion or sham operation. In making a diagnosis of hysteric mastoiditis the local conditions, absence of constitutional symptoms, and the neurotic tendencies of the patient should be considered.

OTITIC BRAIN ABSCESS.

Accumulations of pus within the cranial cavity may be either extradural, intradural, intracranial or intravenous.

Extradural Abscess. Extradural abscess of otitic origin usually occurs immediately over the attic or the antrum. The roof of these cavities is usually very thin, sometimes absent. The infection may reach the cranial cavity either by necrosis of bone in these localities or by passing through openings in the thin bony wall. In all mastoid operations, if the symptoms offer a suggestion of pus within the cranial cavity, the dura above the mastoid antrum should be exposed. If the ordinary rules of asepsis have been observed no harm can come from such exposure, and un-

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(1) Arch. f. Ohrenheilk., B. 52, H. 1 u. 2.
(2) Rev. hebdom de Laryn., April 13 and 20, 1901.

doubtedly lives would often be saved if this simple procedure were more frequently carried out.

Intradural Abscess. Whenever the symptoms previous to operation point toward intracranial abscess, or upon exposure of the dura indications of unusual pressure are observed, the brain should be explored for the presence of pus. The considerable number of fatal cases reported in which the symptoms at least suggested a brain abscess and autopsy revealed its presence, leads to the belief that in mastoid operations the interior of the brain is not explored as often as it should be.

Operation. C. A. Ballance[1] gives the following steps in the operation for otitic brain abscess:

1. Sterilization of the skin. Shave the scalp, scrub it with ethereal soap and sterilized water, wash the soap away with sterilized water, rub firmly with turpentine on a sterile swab and then again with ether. If the operation is not to be done immediately, apply sterilized lint soaked in a glycerin solution of perchlorid of mercury (1 to 1,000). If the operation is to be proceeded with at once, swab the skin with strong carbolic or perchlorid lotion.

2. Anesthesia. The anesthetic should be chloroform and it should be given warily, for, especially in cases of cerebellar abscess, respiration is apt to cease. On two occasions it has happened that with the first few inhalations of chloroform respiration ceased and the operation had to be completed during the performance of artificial respiration. Neither morphia nor strychnia should be administered before the dura has been opened.

3. Incision of the scalp. A flap is to be preferred to a crucial incision. It should be cut with its base downward and should be considerably larger than the opening designed to be made in the skull.

4. Opening in the bone. Failure may result from neglect of the rule of surgery to make a free opening. The trephine employed should be five-eighths of an inch in diameter, of slightly conical shape, and should have the

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(1) Lancet, May 25, 1901.

teeth outside. In temporo-sphenoid abscess the site of application should be about seven-eighths of an inch above the supra-meatal spine, the object being to expose the lowest part of the middle fossa just external to the tegmen antri and tegmen tympani. Immediately above these tegmina are the tissues in which, as a rule, the infective process first develops. When the disc of bone has been removed by the trephine, more bone should be cut away with small saws, forceps, or Cryer's drill until the opening in the skull is enlarged to a paralellogram measuring one and three-quarters inches antero-posteriorly and one inch vertically. The lower edge of the parallelogram is marked by that of the trephine opening. Three-quarters of an inch of its antero-posterior extent should lie behind the center of this aperture and one inch in front. The lowest part of any abscess in the temporo-sphenoid lobe can be efficiently drained through this opening, and the bone disease which is the source of infection can be directly observed and removed. In one case a temporo-sphenoid abscess was opened at its highest part and life was only saved by making a counter-opening in the situation here recommended, the man having been some weeks in a condition of cerebral irritation. If the abscess is above and behind or above and in front of the opening, more bone should be taken away, so as to completely expose the surface of brain which is external to it, or if the surgeon so prefer he may make a trephine opening higher up and utilize the lower aperture as a counter-opening. The former method is recommended. In operating for cerebellar abscess the same trephine should be used. It should be placed on the bone so that its anterior edge touches the posterior border of the mastoid process. Its upper edge should be just below Reid's base line. In this way the horizontal and vertical portions of the sigmoid sinus are avoided. The opening should be enlarged backward and downward until it is quite one and a quarter inches in antero-posterior and one inch in vertical extent. The opening may require enlargement, especially in cases where the abscess extends into the posterior part of the lateral lobe. It cannot be carried forward with much advantage, as the vertical portion of the sinus is in the way of incision of the dura in this direction. It is to be especially remembered that the removal of bone, while comparatively easy before the incision of the dura mater, is not so satisfactorily accomplished when the membrane has been incised and the brain is bulging under pressure.

5. Incision of the dura mater. Here, again, a flap is preferable to a crucial incision. A small aperture should be made with a knife and the flap (having its base upward) should be cut with fine blunt-pointed scissors. Great care must be taken to avoid wounding the vessels of the cortex, which are forced by the intracranial pressure into close contact with the membrane.

6. Discovery and incision of the abscess. When there is sufficient opening in the bone it may be possible to determine by palpation that the abscess is immediately subcortical. An incision should at once be made through the intervening portion of the brain substance into the abscess cavity, care being taken to avoid wounding the vessels in other parts of the body. The use of a trocar and canula, a pus-seeker, or other special instrument is unnecessary and contrary to surgical principles. If the site of abscess is not obvious, it must be sought for by exploratory puncture, and in so doing it should be remembered that the site of the abscess is almost certainly close to the bone disease which gave rise to it. The best instrument to use is a sharp-pointed, long and narrow knife. In the brain, as elsewhere, clean-cut wounds heal more readily than any others, and there is certainly less risk of the abscess being missed when search is made for it with a sharp knife than when any other instrument is employed. Cases could be related of (1) the trocar and canula missing the abscess; of (2) trocar and canula passing through the abscess without tapping it; and of (3) trocar and canula striking the abscess, but failing to penetrate its capsule. The following is an instance of trocar and canula failing

to evacuate a large abscess. The brain was explored in various directions with a trocar and canula, with a negative result. At the necropsy there was found a large abscess with very thick walls, containing four ounces of green offensive pus. So thick was the wall that the abscess shelled out whole and could be rolled about the table. In fact, it needed a sharp plunge with the knife to open it. The use of the knife for the evacuation of an abscess of the brain is not a new operation, but was taught and practiced more than a century ago.

7. The further treatment of the abscess. When the cavity is not entirely closed by the waves of brain substance it may be gently irrigated with a weak antiseptic; but on no account should this be done unless two drainage-tubes are so arranged as to insure the free escape of the fluid. Sterilized normal saline solution is recommended. Unless the opening in the cortex is large the cavity should not be packed with gauze, because the tampon tends to obstruct the free exit of septic material. In one case of abscess of the temporo-sphenoid lobe a large area of bone was removed. The inner wall of the abscess which was at first treated by gauze plugging soon came to form part of the outer surface of the brain and was thus directly accessible for dressing. The best results ensued.

As to drainage-tubes, the rules for their use in abscess of the brain do not differ in any way from those which apply to their employment in the healing of suppurating areas elsewhere. When a tube has been successfully introduced it should not be disturbed for some time. The most successful cases treated in this way are those in which the tube remains undisturbed for many days. Tubes are shortened or removed only as the cavity heals from the bottom. The nature of the tube is of little consequence. All tubes are liable to become blocked with brain débris.

In the case of a small abscess deeply placed in the anterior and inner portion of the cerebellar hemisphere the surgeon may be unwilling to use the knife for evacuation. Recourse must then be had to the exploring trocar and canula, the latter having rings attached by which, when it has penetrated the abscess, it may be immediately fixed to the scalp by silkworm gut. Many a case has been lost after the pus has been evacuated owing to failure to reintroduce the tube in the proper position. The trocar and canula should be of platinized silver. In the event of a counter-opening being made or of drainage occurring through the external auditory meatus, gentle irrigation through the diseased area of brain is beneficial, just as it is in cases of abscess with a counter-opening elsewhere.

8. Closure of the wound and dressing. An aperture is now made at the base of the flap of the size of the opening in the brain, and the edge of the flap is replaced in position and sutured with fine silkworm gut. A powder may be used for dusting around the wound, but it should be sterilized. The dressing may be of sterilized cyanid gauze, either used dry or wrung out of carbolic lotion (1 in 40). A dry sterilized cyanid dressing is recommended and the bandage should, if possible, be so managed as not to cover the forehead.

9. After-treatment. This is a matter demanding the close personal attention of the operator. The dressing may require to be changed daily or not at all, according to the nature of the disease and the condition of the wound. The bowels should be kept open by the administration of some preparation of mercury. In septic cases the pill of colocynth and hyoscyamus is very efficient in clearing the intestines of foul-smelling feces. In regard to food it may be noted that barley water and beef tea are often borne by the stomach when milk is rejected. Hernia cerebri is an evidence of sepsis. It is best treated by sterilized antiseptic dressing. To prevent the dressings from adhering to the hernia some form of protective should be used—perhaps gold leaf is the best. Slight elastic pressure is useful in the later stages of the treatment.

10. Recurrence of symptoms. It is by no means uncommon to have a return of the symptoms a few days after the evacuation of the abscess, due either to the refilling of

the abscess cavity from faulty drainage or to the formation of a new abscess in another part of the same lobe. In the cerebellum it is by no means infrequent to have a second or even a third abscess. Instead of concentrating the attention on the original site of abscess, the new symptoms, such as high temperature, rapid irregular pulse, screaming fits, retraction of head, general twitchings, vomiting, drowsiness, etc., may suggest conditions such as meningitis or acute distention of the ventricles which are not present. The surgeon being led astray by these speculations may fail to act wisely. Many are the vicissitudes of the days and weeks that follow the operation. To be able to choose with certainty and to carry out with precision the various measures which make for success and oppose a disastrous termination, the surgeon must have at his command an exact knowledge of the significance of the various symptoms that arise and of the resources and methods available for their systematic treatment.

Preysing[1] reports three cases of *death from brain abscess* in which careful diagrams of the anatomic relations of the abscess were made after post-mortem examination. Two of the cases are given as follows:

Case 1 (Plate VI). An abscess of the right temporal lobe was opened after radical operation; leptomeningitis and death followed: Autopsy of the cranium: A large funnel-shaped wound behind the right ear, embracing the entire mastoid process and the lower part of the squama, leads to the tympanum, and the floor of the middle and posterior cranial cavities. The sigmoid sinus down to the jugular bulb, the tegmen of the antrum and tympanum, and a small part of the brain under the squamous portion are exposed. The sigmoid sinus is not thrombosed and is covered with recent granulations; a perforation of the dura of the middle cerebral fossa exists externally to the tegmen tympani and communicates with a cavity in the right temporal lobe of the size of a pigeon's egg, which still contains pus and dirty granular masses, and

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(1) Arch. of Otol., April, 1901.

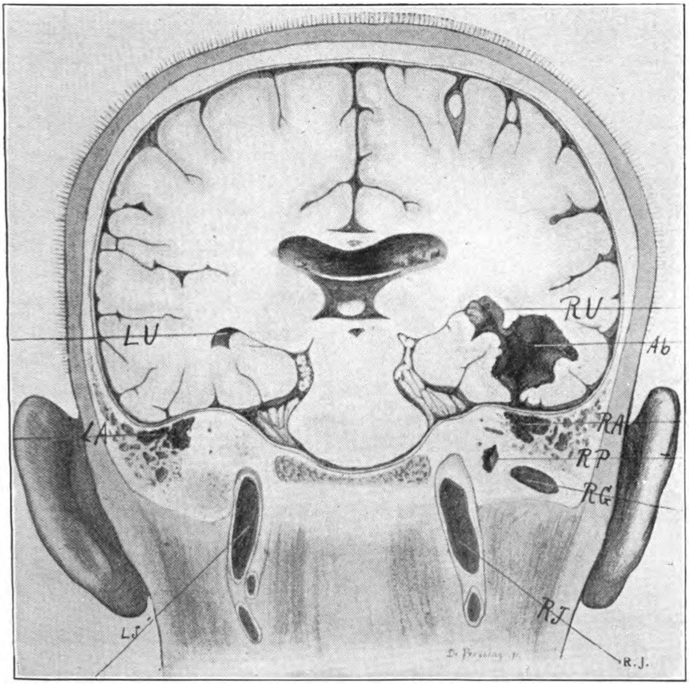

PLATE VI.

Brain Abscess. Illustrating Preysing's Article.

(Arch. Otol.)

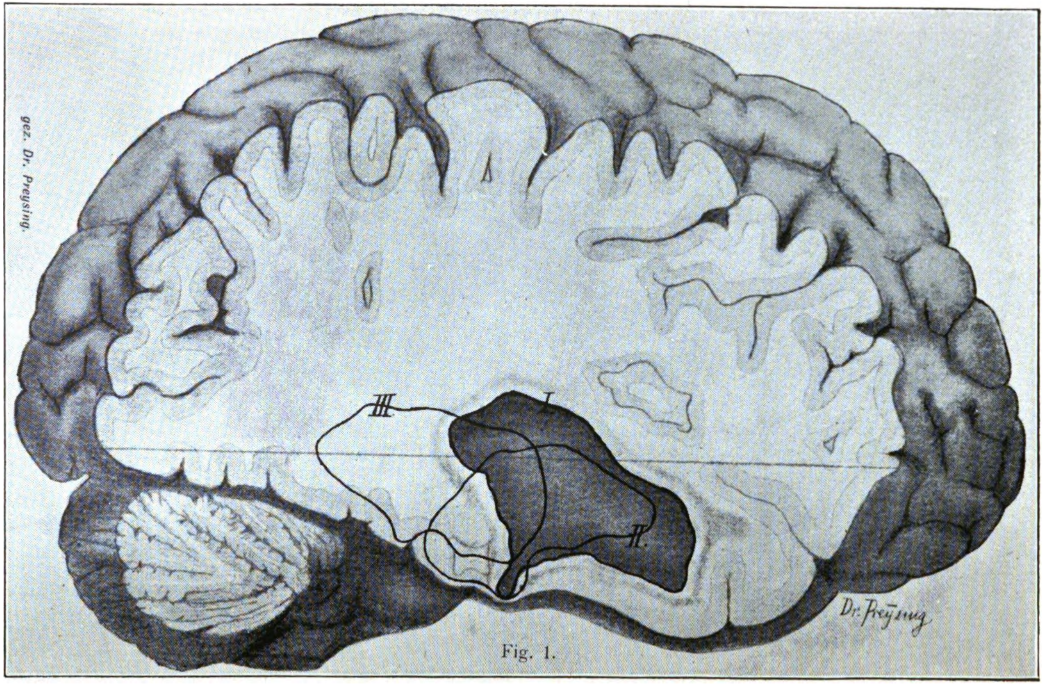

Fig. 1.

PLATE VII.

Brain Abscess. Illustrating Preysing's Article.
(Arch. Otol.)

is lined with tough walls. The cerebral convolutions are flattened and the pia of the convex surface of the right hemisphere is hyperemic; at the base it is infiltrated with pus. The dura shows on its inner surface ecchymotic spots. The substance of the brain about the abscess is cloudy, soft and discolored.

Case 2 (Plate VII). An abscess of the right temporal lobe was incised after a radical operation. The tenacious contents did not escape, but ruptured into the lower horn of the lateral ventricle and caused death by purulent leptomeningitis. Autopsy of the cranium: The wound in the right temporal bone embraces the region of the mastoid, tympanum, and antrum, and extends into the middle and posterior cranial fossæ. The dura appears normal, except for an area as large as a pinhead, just between the roof of the antrum and the edge of the pyramid, just back of the right superior semicircular canal, where it is discolored a dirty reddish-brown. A horizontal section of the brain discloses a large abscess in the right temporal lobe, with dirty granular contents. The walls are firm and are surrounded by softened and discolored cerebral substance. The right lateral ventricle is distended with thick green pus, displacing the ventricular septum. A large opening establishes communication between the abscess and the inferior horn of the ventricle. The brain substance between the abscess cavity and the squama is fully 1 cm. thick, but between the cavity and the tegmen it measures only ½ mm. On the lower-outer portion of the abscess a hemorrhagic area indicates the line of incision made at operation. The pia of the convexity is extremely congested. A large circumscribed pus focus is situated between the upper surface of the cerebellum and the tentorium and extends along the sigmoid sinus and the auditory nerve. The sinus is not thrombosed and is of normal appearance, excepting a sanguineous discoloration on the surface exposed by the operation.

Healing of Brain Abscesses. Passow[1] reports the case

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(1) Arch. of Otol., Feb., 1901.

of a man who committed suicide seventy days after an otitic brain abscess had been drained. The patient had purulent otitis media with mastoid symptoms for one month. Operation. Periosteum was slightly thickened. Blood-points appear here and there on the planum. After the first stroke of the chisel, creamy pus welled out, which was under high pressure. The cortex was removed and a large cavity laid open, which was filled with pus, granulation tissue and bone grit. The sinus was bare to a large extent, and covered with granulations. The mastoid tip contained a large cell filled with pus. The cavity, which communicated with the tympanum, was scraped out with the curette. Superiorly, the dura mater covered with flabby granulations, was bare. In scraping off the latter pus oozed out from above and the probe entered a cerebral abscess about 3 cm. deep. The opening in the dura was enlarged by a cross-cut, and, after all the pus had drained out, the abscess was loosely filled with gauze. The same material was used for tamponing the mastoid cavity and external canal. The next day some pus escaped from the cerebral abscess; tamponing was omitted and as the secretion ceased the incision in the dura was allowed to close.

The course of healing was favorable. After one week the discharge from the tympanum ceased; the perforation of the drum closed and the function improved rapidly from 4 m. for whisper to nearly normal. The mastoid wound looked well and became smaller. Patient was discharged from the hospital one month after operation, but continued to return for treatment. A recurrence of the otitis media and pain in the head caused melancholia and the patient cut his throat with a pocket knife, dying within a few minutes.

Autopsy. The skull-cap was thick and the dura in several places adherent to the bone. In lifting the brain a piece the size of a large pea remained attached to the tegmen tympani. This left a defect in the brain, from which a barely visible cicatrix, 1.5 cm. long, without pigment, softening, or fibrous tissue, could be traced into the brain-substance. On detaching the dura from the tegmen tympani the opening made by the operation was recognized and found filled with loose cicatricial tissue. The gauze in the mastoid wound was impregnated with serous but not with purulent secretion. Careful examination of the mastoid wound nowhere revealed diseased bone. The wound had closed considerably. The middle ear was in normal condition. The fact was noted that the tegmen tympani on the healthy side was exceedingly thin and cribiform. Incidentally a small lenticular osteoma with sharp notched edges was found in the falx cerebri.

Remarks: An acute otitis media had caused a mastoiditis and the formation of a perisinuous and a small cerebral abscess. As unfortunately frequently occurs, the symptoms were insignificant compared with the seriousness of the disease. Even the extensive destruction in the mastoid process could not be diagnosticated with certainty before the operation. Only the irregularity of the pulse aroused the suspicion that the process had reached the cranial cavity. It is not surprising that the cerebral abscess itself had not caused any conspicuous symptoms, as it was only in its incipiency. The course of healing was extremely favorable. The discharge from the brain abscess ceased on the second day.

Macewen states that the cavity of even large cerebral abscesses of acute origin fills up within a few hours after evacuation, by the expansion of the formerly compressed brain-tissue. The same had happened in the above case, and at the post-mortem nothing could be seen of the upper part of the abscess but a barely visible linear scar. Only the part next to the dura had not closed immediately, but was filled with cicatricial tissue continuous with the cicatrix of the dura. A microscopic examination was made of a section through the dura and the cicatricial tissue at the place of the operation. The dura mater around the cicatrix is thickened; it thins out toward the perforation and is entirely missing for a distance of 1.5 mm.; there it is replaced by a thin layer of connective tissue, which—

as shown under a higher power—consists of spindle-cells with interspersed leucocytes. The pia mater is closely attached to the dura and it is gradually lost in the cicatrix. The substance occupying the abscess cavity is partly cicatricial tissue and partly degenerated brain-substance. The cerebral cicatrix proper is recognized as the part above the perforation, and especially two cords, which, starting from the dura, run for about 3 mm. into the brain-substance, the one parallel to the dura, the other nearly at right angles to it. These two cords consist of fixed connective-tissue cells, between which are situated small round cells and larger cells with large nucleus and granular protoplasm. Elements of nerve tissue cannot be found in these cords. In the cord parallel to the dura a group of large polynuclear giant-cells are noticed lying close to several winding, tape-like bands, which are highly refracting and do not take the stain. These bands are partly frayed and the giant cells are deposited between the fibres. Evidently—as Dr. Hegener has found—these bands are cotton-fibres, left from the dressing material and healed into the brain-substance. The giant-cells must be considered as "foreign-body giant-cells." Between and around the above-described cords the glia tissue is ill defined, very vascular, and contains also numerous round cells. The nerve cells are irregular in shape, of different sizes, devoid of processes and partly of nuclei. The cerebral tissue around the cicatrix (within a radius of 7 mm.) shows similar changes. There also the nerve cells are of irregular form and without processes; in some the nuclei are missing. Here and there are groups of round cells. The blood vessels are dilated. There is no sharply defined boundary line between the abnormal and the normal tissue.

Oscar Dodd[1] reports a *fatal case* in which a mastoid operation was done, and later the wound was reopened and the brain examined because of cerebral symptoms. At the autopsy a brain abscess was found arising from a purulent accumulation in the body of the sphenoid which had

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(1) Laryngoscope, May, 1901.

not been recognized during life. The otitis media and resulting mastoid trouble were probably due to infection from this pus cavity. This case emphasizes the importance of searching for possible as well as probable causes of brain diseases.

Cranial Cholesteatoma. O. Körner[1] reports a case of true cholesteatoma of the posterior cranial fossa arising from a suppurative otitis media. The patient, a man aged 41, when admitted to the hospital, complained of pain in the left side of the head and deafness of left ear. There had been a profuse purulent discharge from the ear, which had ceased a month before. Midway between the left ear and the occipital protuberance was a somewhat soft, flattened swelling about one and one-half inches in diameter. There was no change in the skin over the swelling. Through the center of the swelling a triangular defect in the bone could be felt. This opening had sharp edges; no pulsation could be felt through it. There was apparently no change in the mastoid region. The left auditory canal was unchanged; the membrana tympani was dull and thickened, somewhat bulging and reddened posteriorly. Puncture brought only blood and serum. Nothing noteworthy on the right side. No disturbances of equilibrium. The only abnormal condition in the eyes was optic neuritis and beginning venous stasis in both, most marked in the left. Temperature 37° C, pulse 96 to 104. Speech and facial movements undisturbed.

Operation next day. As soon as the swelling was incised there was a flow of odorless pus to the extent of half an ounce. Protruding from the triangular opening in the bone was a shining, pearly mass, which came away in layers when scraped with the spoon. Granulations covered the edges of the opening. The whole mass, amounting in size to two hen's eggs, was removed by the scraping process. The bones of the skull covering the mass were only as thick as paper over a large area of the parietal, temporal and occipital bones, and the diploë had entirely

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(1) Arch. of Otol., Aug.-Oct., 1901.

disappeared. The lower part of the occipital lobe and the cerebellar hemispheres were much displaced and compressed, and the dura to a considerable extent was covered with coarse granulations. Pulsation could be felt, but not seen, and the cavity extended as far as the torcular Herophili. In many places the bone was eroded and some of the mastoid cells had been opened by this process; there was no sign of pus in them. The cavity was lightly packed with iodoform gauze and a strip brought out through the auditory canal. The patient did well continuously and ten weeks afterward his wound had healed. The fundus oculi appeared to be restored to a normal condition. Patient gained twenty pounds during convalescence.

This extraordinarily large cholesteatoma lay in the posterior cranial fossa, and extended from the petrous portion of the temporal bone to the torcular Herophili. The bones in contact with the growth were everywhere thinned, and in one place perforated, and the mastoid cells were also opened. That the tumor had been growing a long time was made evident by the fact that it was so large, and also because it required four weeks for the brain and cerebellum to expand in the cavity to their normal proportion.

SINUS THROMBOSIS.

The increasing number of cases of sinus thrombosis which are reported makes the consideration of this subject of special interest.

Symptoms. J. F. McKernon[1] reports seven cases, and from his observations in these cases gives the following outline of symptoms: Temperature. This depends upon the amount of septic material entering the general circulation. If the amount is large, the fluctuation will be great and the changes sudden. If the amount of septic material entering the system be small, the fluctuation will be less

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(1) Laryngoscope, June, 1900.

marked and the changes will be gradual. Other complications may materially influence the temperature. An accumulation of pus in the brain has a tendency to keep both the temperature and the pulse down. Pulse. This is apt to bear the usual relation to the temperature. Chills. They are usually present and are a valuable aid in diagnosis. The severity of the chill with the accompanying temperature changes seem to bear some relation to the amount of systemic infection. Chilliness occurring in the course of suppuration of the middle ear should put us on our guard. Pain. In most cases it is greater than in ordinary mastoiditis. It is usually referred to the side and back of the head. When the internal jugular becomes involved, pain is referred to the side of the neck, though it is probably due to the infected lymphatic glands more than to the diseased vein. Nausea and Vomiting. These symptoms in greater or less degree are usually present. They occurred in all the seven cases reported. Respiration. During the early stages the rate is little affected, though later it becomes rapid. In two cases reported it was above sixty per minute. Vertigo. Usually absent unless meninges are involved. Consciousness. Cerebration is usually below normal. Questions are answered with hesitation. Meningeal involvement greatly increases the prominence of this symptom. Intra-Ocular. A neuro-retinitis is present in a certain number of cases. Of the seven reported, six were examined and fundus changes found in only two. Constipation. In all cases coming under McKernon's observation this symptom was present, and is one which he believes co-exists with the earlier stages of the disease. In the later stages of the disease of the abdominal type, or when there is an advanced general sepsis, then diarrhea is present. Septic enteritis, with a metastatic deposit in the intestines, was present in one case, and for several days prior to the evacuation of the deposit presented very much the clinical picture of typhoid fever.

Local Symptoms. The so-called Greisinger's symptom (edema over and around the mastoid and occipital veins) was present in five of the seven cases. Stiffness of the muscles of the neck on the affected side is a more or less constant symptom. In two of the jugular cases the lymphatic glandular involvement, both superficial and deep, was very marked and a valuable aid in diagnosis, though this involvement does not always indicate phlebitis of the veins, as in a Bezold perforation the lymphatic infection in this region may be a prominent feature, so that enlarged glands in this situation are by no means always secondary to jugular involvement.

Among some of the general symptoms at the outset of the disease may be mentioned malaise, loss of appetite, a heavily furred tongue and a foul breath. The face wears an anxious and pallid look, the skin is dry and later presents a yellowish tinge, indicative of sepsis. Nearly all of these symptoms enumerated were present in the cases reported in this paper.

Treatment. No uniform plan or procedure can be adopted in these cases, but each individual case should be treated as seems best at the time. A complete and thorough exposure of the sinus before opening it is desirable in all cases. The field for operation should then be flushed with peroxid of hydrogen. This should be followed by a second flushing with absolute alcohol. A freshly sterilized aspirating needle (recently tested) should then be thrust through the dura, covering the sinus. The part usually explored first is that lying above the bend or knee, and the other portions of the sinus can be explored in like manner. The needle should be introduced, not directly downward, but for some distance, one or two inches, along the lumen of the vessel. If a negative result be obtained, and one is still in doubt on account of the physical appearance of the sinus, it is better to make a small opening in the dura covering the sinus with a scalpel, than to limit the procedure to simply an unsatisfactory aspiration.

If a clot be found, then the dura covering the sinus should be opened freely and the clot removed with a curette, together with any disintegrating material that may be present. When the clot is removed and the blood flow established from the proximal end, it should be allowed to flow for a few seconds, so as to remove any further clot or septic material that may be present in the vessel further back. The flow of blood is then easily controlled by packing a small piece of folded gauze directly against the lumen of the vessel. The lower portion of the sinus can then be proceeded with in the same manner, and after the removal of the clot an attempt made to restore the circulation at the bulb. In a fair number of uncomplicated cases this can be done quite easily, but in others it becomes impossible without dangerous manipulation; and in these cases where the sinus has been freed from a septic clot, or the presence of pus, and the region of the neck shows no jugular involvement, it is better to cleanse the operative field and pack the sinus firmly to the bulb with gauze, rather than to proceed any further. If, on the other hand, upon opening the sinus we find a disintegrated clot or pus, or both, present, then, without further manipulation above, we should, as rapidly as is consistent with carefulness, expose, ligate at the clavicle, and resect and remove the internal jugular vein of that side to its commencement at the bulb.

If the facial, maxillary, thyroid, or other veins be involved, they should be ligated beyond the point of involvement and resected also. All enlarged glands, during the course of dissection, should also be removed, so as not to leave any possible field for infection subsequently. Care should be taken to completely separate the pneumogastric nerve from the vein at the lower point of ligation, before cutting the vein, as here the vein and nerve lie very close to each other. The soft tissues of the neck should be flushed with a hot saline solution and closed by sutures to within an inch of the bulb. After this it becomes an easy matter to remove the pus and disintegrated matter left in the sinus. If any sloughing edges of the dura over the sinus be present they should be removed, as otherwise they retard the healing process. In a septic case, after operation, when the case does not progress favorably as we think it should, it is best to wait for a time before any other procedure is instituted; for we must remember the fact that here is a septic case, developing for several days, with a gradual absorption into the system of a poisonous element, and it would be strange indeed did the recovery not show some evidence of a past and present sepsis, while the septic material is being eliminated from the system.

The time to operate on a case of sinus thrombosis is as soon as the diagnosis is made, and if in doubt it is better to make an exploratory operation early rather than wait for an array of symptoms that no one familiar with the disease can fail to recognize. During a prolonged operation for this disease there is no method of stimulation that will compare in its beneficial effect with a hot saline enema, provided the patient becomes weak. This can be repeated if necessary. If the patient does not respond quickly, after being put to bed, and it becomes necessary to stimulate by other means, then a direct transfusion of a normal salt solution can be done. One of the most valuable aids to immediate recovery after operation is the administration of oxygen while the patient is coming out from under the anesthetic. Its further administration at intervals for a period of three or four days is of great advantage.

Hoelschen[1] reports a case of latent thrombosis following otitis media. Shortly after the otitis occurred, brain symptoms developed. Afterward the patient's condition improved and he returned to work. Two months later mastoid symptoms developed and in operating a mass of granulations was found occupying the position of the sigmoid sinus, and connected with the ear by the remains of the emmissary vein. The mass was removed, and the cavity packed with gauze. The patient recovered.

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(1) **Münch. med. Woch., Aug. 27, 1901.**

INTERNAL EAR.

The most important contribution to the literature of the internal ear in recent years is by F. Siebenmann.[1] In a great number of cases he has made post-mortem examinations of the ears and has made microscopic slides to show the pathologic changes. He describes a condition which he calls "spongifying of the labyrinth."

Spongifying of the Labyrinth. The change noted in this condition is a localized rarefaction of different areas in the labyrinth capsule. There seems to be a predilection for the neighborhood of the oval window where it causes ankylosis of the stapedial footplate. The symptoms upon which the diagnosis has been based and later confirmed by post-mortem examination are: 1. Progressive deafness occurring usually in young adults and not improved by inflation or other treatment of the middle ear. 2. In examination with the tuning-fork the Rinné test is negative, while the hearing for the low fork (A) by bone conduction is increased. 3. There is considerable loss of hearing by air conduction for the lower tones of the scale. The result of treatment is unsatisfactory.

Labyrinthine Vertigo. R. A. Bachman[2] differentiates between tympanic vertigo and labyrinthine vertigo or true Ménière's disease. That the semicircular canals are involved in either case from their physiology seems reasonably certain. They are essential in the function of equilibration. The pressure of the endolymph upon the terminals of the auditory nerve produces an irritation of its filaments; the impression being transmitted from there by the nerves to their centers. If pressure be made on the round window, dizziness and inclination to fall backward are produced by the transmitted pressure upon the ampulla of the posterior canal. Pressure upon the footplate of the stapes produces a rocking of the head from side to side

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(1) Arch. of Otol., April and June, 1900.
(2) Jour. Am. Med. Assoc., May 18, 1901.

through pressure transmitted to the superior canal and ampulla. The horizontal canal, owing to its location, can not have pressure exerted upon it. When strong pressure is made upon the fluid within the vestibule, simple vertigo results.

These physiologic facts easily account for the dizziness and tinnitus in middle-ear affections immobilizing the stapes in the round window either by direct impaction of the footplate or by pressure upon it from the incus. However, that this impression made upon it from the end filaments of the nerve by pressure can not also be caused by a changed state of the filaments themselves is altogether untenable and not supported by pathologic investigation nor clinical facts.

Etiology. Regarding the etiology of true Ménière's disease, age above 30 and the male sex seem to be factors. Syphilis and the rheumatic diathesis are probably the most frequent direct causes. Exposure, senile changes, blood changes as leukemia and simple anemia, hemorrhages, traumatic or idiopathic, serous effusions, cerebral disturbances, parotitis and influenza frequently factor directly in the causation. This list necessarily forecasts the pathology which is chiefly inflammatory with or without hemorrhages, but, as far as can be learned, without the formation of pus. There is much obscurity as to the pathology and more work must be done to clear it up.

Symptomatology. The symptoms are grouped about four cardinals, viz., vertigo, tinnitus aurium, progressive deafness, and gastric disturbances. Vertigo appears first in the majority of cases, concurring in others with tinnitus and deafness. These always follow a parallel course. Beginning usually in one ear, they increase in severity for a time, remit, increase again and finally subside partially while the other side becomes affected. The tinnitus gradually grows worse till it finally ceases in one ear and then in the other, complete deafness marking its cessation. The deafness and tinnitus may be bilateral and appear suddenly, as illustrated in the case of a young girl, who, having exposed herself during menstruation, was seized suddenly with vomiting, vertigo, bilateral deafness and tinnitus, and died on the fifth day, the autopsy revealing a serous hemorrhagic fluid in the semicircular canals.

The vertigo begins usually with slight and transient attacks having a tendency to progress in severity, but following no definite interval in their recurrence, excepting that in the later stages the intervals are shortened. They may vary from one attack a month to four or five a day. Seemingly they are aggravated by overwork, sudden movements of the head, turning in bed, blowing the nose, indiscretion in diet, constipation, excitement and changes in the weather. In character they show a great diversity in the same individual as well as in different cases. They may begin with a sensation of rotation or slanting of the head. There is a tendency to walk toward the side affected or fall toward that side in the paroxysm. Often the vertigo is a simple swimming of the head which may be subjective or objective: subjective if the patient feels himself turning, objective if his surroundings revolve about him. During the paroxysm the vertigo increases, the tinnitus becomes loud and roaring or shrieking. The patient begins to fall and seeks support until the sensations abate. Consciousness is usually present in the attack and voices can be distinguished and understood. In the severer attacks consciousness may be wholly or nearly abolished. Total loss of consciousness is rare. The onset, duration and course of the symptoms are in a great measure dependent on the etiology. Systemic influences produce a long course with gradual onset. Hemorrhages and traumatism, acute infectious processes and some forms of rapid syphilis produce a more or less sudden onset with a subsequent shorter course.

Gastric disturbances manifest themselves during the attack of vertigo. There is a feeling of wretchedness and nausea which ends in vomiting very much like a bilious attack. During the interval the stomach appears well in most cases, but a tendency to constipation is marked and presents an important consideration in the successful treatment of the disease. Besides these symptoms, nystagmus, volitional tremor, loss of memory and weakness of the extremities are also noted. Nystagmus has been observed by Hughlings Jackson, Gruber and Jacobson. It is present with the nervous symptoms. Loss of memory and weakness are most marked in senile and rheumatic cases.

Recognition of the Affection. The disease, owing to its anatomic location, is not well understood at the present time. Enough of evidence, however, is in to justify the opinion that Ménière's is a disease by itself, although rarer than supposed. Aural vertigo is a general term of which Ménière's disease is a particular form. It is a disease involving the terminal filaments of the acoustic nerve in the labyrinth, and follows a definite course tending to end in deafness. Pathologic changes in the middle ear may cause, in part, similar symptoms, having, however, dissimilar sequence, course, termination and pathology. Besides this, Ménière's disease yields to non-surgical treatment in most of those cases in which the cause is ascertainable.

Labyrinthine Syphilis. In a series of twenty-five hundred consecutive cases of ear disease, F. R. Packard[1] found four cases of syphilitic affection of the labyrinth. It is usually late in the course of syphilis before lesions of the labyrinth manifest themselves. The subjective symptoms are tinnitus and deafness, peculiar in that they are of sudden onset, especially the deafness. Hearing is generally lost in both ears, though occasionally in but one. Unilateral facial paralysis is a not infrequent phenomenon.

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(1) Jour. Am. Med. Assoc., June 15, 1901.

MISCELLANEOUS.

Mechanical Aids to Hearing. Of the hearing devices, according to J. A. Kenefick,[1] the most successful ones are constructed upon some well-recognized principle of acoustics and are intended to reach the labyrinthine acoustic terminals by concentrating and intensifying sound waves either through the external auditory meatus or by conduction through the bones of the head or face. No one apparatus has been found applicable to every case, and the latest productions in this line prove no exception to the rule. In proportion to the number of really deaf people those resorting to mechanical aids are comparatively few in number. This seems to be accounted for by two factors, namely, the conspicuousness of these instruments and the intolerance of their aid by oversensitive acoustic nerves which are present in the great majority of afflicted individuals. The first is an objection which might be overcome by the cultivation of certain moral courage on the part of the patient, while the second is a physical difficulty and may prove a serious hindrance to the use of any mechanical aid based on the above principles.

The latest device for this purpose is the akouphone, an electric apparatus which may be considered as a telephone with electric force supplied by a compact storage battery of six volts. The transmitter is fitted with one or a series of dome or funnel shaped resonators for the purpose of gathering in and concentrating sound waves from all sources in its immediate neighborhood. Its receiver is so constructed that all sounds conducted to it are reproduced or retransmitted with such force and intensity as to produce a searching and sonorous wave of peculiar intensity and penetration which is magnified still more on account of the closure of the external auditory meatus by the instrument, which is held so as to completely cover it. The nature of this wave, which gives a saw-tooth character

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(1) Med. News, April 13, 1901.

to its tracing, is not yet understood. In ordinary use the storage battery is carried fastened at some convenient place about the body, while the transmitter or wave collector may be held in the lap or laid upon the table. The receiver is fitted with a handle of suitable length so that it may be held in close contact with the ear with its vibrating diaphragm directly over the external meatus. This receiver is to a certain extent under control and the intensity of its action adjusted either by manipulating the adjustment of the diaphragm or by means of a sliding switch on the handle and manipulated by the patient's finger.

This is the outfit ordinarily recommended for the partially deaf. When used at the opera or lecture its transmitting end is reinforced by adding an increased number of wave gatherers, its receiving end being adjusted as nearly as possible to the toleration of the patient's auditory apparatus. When used for the instruction of deaf mutes a special transmitter is used and the receiver again adjusted to the comfort of the subject's hearing apparatus.

Deaf individuals who seek mechanical aid for their affliction (commonly without the aid or advice of an aurist) come generally under one of the following headings: 1. Those whose membrane and ossicles are intact, but functionally embarrassed by sclerosis or injury while the nerve is yet free; 2. Those whose conducting apparatus is embarrassed by the absence of the ossicles or greater part of the tympanic membrane, the nerve remaining free; 3. Those in whom there has been disease involving but not wholly destroying the labyrinthine nerve terminals—deaf mutes; 4. Those whose deafness is caused by destruction of the nerve function somewhere in its central course.

In the first class of cases we find in the great majority flaccidity of the tympanic membrane and hyperesthesia of the acoustic nerve. The tensor tympani in such cases has no function and consequently fails to protect the hyperesthetic nerve terminals in the labyrinth against these new sound waves. Add to this, possibility of obstruction in the Eustachian tubes and we have with the receiver held close against the ear a condensation of sonorous waves of such intensity as to be practically unbearable. All noises in the immediate vicinity, such as the closing of a door or the shutting of a window, are here intolerable, and interfere with conversation in no uncertain way. It is well to remark in this connection that in some cases presenting a considerable degree of deafness with symptoms of labyrinthine involvement, such as vertigo and tinnitus, these alarming symptoms may depend upon purely mechanical causes and may wholly disappear after ventilation of the tympanum through the Eustachian tubes. Resort to any mechanical aid under these circumstances would be a serious mistake for such a patient.

When membrane and ossicles are both missing, and no involvement of the nerve is present, the patient being dependent entirely upon bone conduction, it would seem that the conditions were theoretically favorable for the use of the akouphone on account of the intervening bone. As a rule, however, such patients seldom resort to mechanical aids as they hear the loud voice fairly well.

In the third class of cases, which includes the deaf-mutes, we find perhaps the greatest field for the practical use of this apparatus in teaching these unfortunates articulate speech. This was recently well demonstrated before the Otologic Section of the Academy of Medicine, and judging from a single short lesson given to a deaf mute of 18 years, who had practically never heard anything, it was easily evident that the articulation and even inflection of speech could be conveyed by these means to such individuals with a greater degree of success than has ever before been attained. To the fourth class, with central lesions, no aid can be offered.

Carcinoma of the Ear. L. Treitel[1] reports three fatal cases of carcinoma of the ear. The increased number of cases of cancer reported recently does not indicate increased prevalency of the disease, but it is more probable

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(1) Arch. of Otol., June, 1901.

that the percentage is raised by the recognition of cases with the microscope whose cancerous condition was formerly overlooked when the microscope was not so universally employed. Judging from the observation of others, it would seem advisable in all cases of chronic otorrhea occurring in middle life, which show a tendency to recurrent formation of granular tissue, to make a microscopic examination of the pathologic structure. Cases are on record which were not recognized as carcinoma until after operation upon the mastoid, presumably for ordinary caries; their malignant character became apparent by the rapid disintegration of the edges of the wound. In the prognosis of carcinoma of the ear a point of importance is the early recognition of the condition and an early radical operation. As long as the growth has not extended beyond the auricle or cartilage of the ear canal a radical operation offers some hope for a permanent cure. In one of Kuhn's cases there had been no return six years after the removal of the membranous ear canal and auricle for cancer of the ear. Denker also had a similar experience. When the mastoid cells have once been encroached upon, Schwartze and others do not approve of operative interference, believing that such measures only tend to hasten death.

Aseptic Head Mirror. In all ear work, and especially when asepsis is necessary, Zarniko[1] emphasizes the importance of a clean forehead mirror. He uses a detachable white forehead band which can be removed and washed. The mirror should be moved or adjusted by means of a detachable and aseptible double plate.

Acoumeter. E. Amberg[2] has constructed an instrument intended to accurately test the patient's hearing ability. A steel ball of given weight is made to fall upon a metal plate. The sound produced is regulated by the distance the ball falls. A record is made of the distance the patient can hear the sound when the ball falls from a given height, or with the instrument a given distance from the patient

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(1) Monatschr. f. Orenheilk., No. 4, 1900.
(2) Jour. Am. Med. Assoc., Jan. 5, 1901.

a record is made of the distance the ball must drop before the patient can hear it strike upon the metal plate. When so used the instrument becomes one of great precision. The results secured in the examination of patients by different physicians can be satisfactorily compared, as the different instruments are made so that they do not differ one from another.

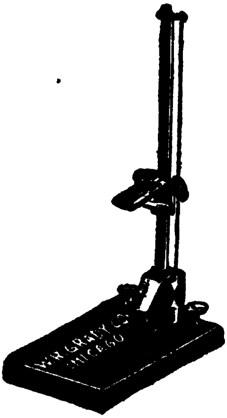

Fig. 17.
Amberg's Acoumeter—One-fifth Natural Size.

Ear Diseases Affecting the Eye. S. Oppenheimer[1] states that eye manifestations are not present as long as the ear disease is limited to the middle ear and mastoid cells, but there are eye symptoms in 50 per cent of the ear cases complicated by intracranial invasion of the inflammatory process. When present it is not pathognomonic of such complication, but only confirmatory. The affections of the eye reported as a result of ear disease are: Swelling and puffiness of the eyelids, conjunctivitis, keratitis, retinitis, neuroretinitis, papillitis, choked disc, and, in rare instances, paralysis of some of the external muscles. Inflammation of the lids, conjunctiva and cornea may be caused by infection conveyed by the hand or handkerchief from the ear to the eye.

Uric Acid. It has long been recognized that there is an intimate relation existing between certain middle-ear inflammations and uric acid poisoning, though most of us are hardly prepared to agree with Cornelius Williams[2] when he says that nine-tenths of all the inflammations of the ear and mastoid both acute and chronic as observed in the Northwest are due to uric acid poisoning. In speaking of "uric acid poisoning," he means to include its various compounds and for the sake of convenience the

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(1) Phila. Med. Jour., Feb., 1901.
(2) Jour. Am. Med. Assoc., Aug. 24, 1901.

products of insufficient digestion as well as some results of fatty tissue metabolism. Uric acid inflammations of the ear occur in summer and winter, but most frequently in late winter and early spring, and affect persons of all ages —babies in arms and the old as well. Those affected, according to his observation, have always been persons who ate nitrogenous food in excess of their requirements. The adults were meat eaters, often almost to the exclusion of vegetables, and the babies were bottle-fed. Further, there is generally a distinct history of gout or rheumatism, but more especially intestinal disorder due to fermentation or putrefaction.

In accordance with this view, while not neglecting other measures, the salicylates hold a very prominent place in the plan of treatment.

Congenital Deafness. Danziger[1] believes that congenital deafness is often due to congenital malformation of the temporal bone. Usually in such cases other defects are found in the base of the skull.

Binaural Hearing. B. A. Randall[2] believes the value of "binaural hearing" has been greatly underestimated. With both ears normal, while we may be cognizant of all the sounds assailing us we are able to hold the attention concentrated upon those which we desire to hear amid a babel of irrelevant noises, undisturbed unless we permit our thoughts to wander. One ear is often given to sounds engrossing us while the other merely keeps guard-hearing, yet giving no heed to the sounds upon that side and even almost automatically side-tracking those on the busy side, which might confuse its task. The condition is very different when one ear must act alone, unaided by its fellow. Then, one side of the brain to a much greater extent than usual, has to receive and analyze all the impressions, and these lack that element of double yet diverse character which in vision we call stereoscopic. With the ears we have no strain of accommodation or convergence (which

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(1) Archiv. f. Orenheilk., Vol. 51, No. 1.
(2) Phila. Med. Jour., May 4, 1901.

should be no burden to healthy eyes), but the absence of these functions leaves us devoid of any such ready means of determining the distance, and hence many other characteristics of the objects of our attention, and throws the more work upon the interpreting faculties. While patients may be unconscious of the effect of unilateral deafness, yet, Randall believes, it is fully time that the value and importance of "binaural hearing" should be more fully recognized, and that due care be exercised to retain or secure it in those who are really, if unconsciously, suffering for the lack of it.

THE NOSE AND THROAT.

INTRODUCTION.

The Editor of the department of diseases of the nose and throat desires to express his acknowledgments and thanks to the abstract editors of the laryngological journals. Their excellent work has materially lightened his labors. While the aim of the resumé has been to record the advances which have been made in our specialty during the past year, it has been deemed inexpedient to omit, altogether, mention of some of the well-known and important subjects about which little that is new has been written during the year, and no apology is therefore made for the paragraphs, which repeat what has been said before, concerning, for example, adenoid vegetations and tubercular laryngitis.

Society reports and case histories have been for the most part omitted. Space was limited and the special journals made their record unnecessary. Editorial comment has been indulged in but rarely, partly because the year book is not a text-book, and also because the selection of abstracts made is intended to illustrate the present viewpoint in laryngology and rhinology. T. M. H.

THE NOSE AND THROAT.

THE NOSE.

Physiology. C. A. Parker[1] has conducted a series of experiments to determine the course of the air currents in nasal respiration. His method is to have the subject sit in front of him, and to breathe naturally through the nose while he holds a Kabierski insufflator filled with lycopodium six inches from the nostril and gently puffs the powder into the air the patient breathes. After examining the result of this experiment, he puffs the lycopodium more liberally while the subject breathes deeply through the nose. In studying expiration the subject exhaled cigarette smoke while its course was watched by means of a nasal speculum. Summary: 1. During quiet inspiration in a normal nose the air traverses the middle, superior and probably the fourth meatus. 2. Inspiration is impeded by: (a) spurs and deviation of the septum and enlargements of the inferior turbinated body if they project forwards and upwards; (b) enlargements of the middle turbinate, polypi, etc.; (c) hypertrophies and growths springing from the vault of the naso-pharynx. 3. In expiration the air traverses chiefly the inferior meatus. 4. Expiration will be more especially affected by: (a) hypertrophies of the posterior end of the inferior turbinate; (b) hypertrophies, etc., causing stenosis of the inferior meatus.

Coryza. G. C. Stout[2] presents a readable article on the etiology, pathology, symptoms, prophylaxis and treatment of acute coryza. The chief underlying cause is a depressed state of the nervous system, which results in sluggishness

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(1) Journal of Laryngology, July, 1901.
(2) Therap. Gaz., Jan. 15, 1901.

of the heat-producing centers. Rational clothing, avoidance of draughts, care of the digestive functions, and maintenance of nervous tone are the chief elements of prophylactic care. Too much clothing is more apt to be worn than too little. As a preventive measure, a brisk, dry massage of the body and limbs, morning and evening is excellent. After an attack has started, the bowels are to be regulated by a saline cathartic, nerve tone increased by strychnin, and excessive nasal discharge restricted by the following tablet:

Morph. sulph	gr. 1-32
Strych. sulph	gr. 1-95
Atropinæ sulph	gr. 1-150
Acid. arsen	gr. 1-100
Aconitin	gr. 1-1000

M. Sig.: One to three daily, according to symptoms.

Once daily, local treatment is given by the physician with great gentleness. The nose is first thoroughly sprayed with an alkaline antiseptic solution, then by a 1 per cent solution of cocain containing two grains of boric acid to the fluid ounce. After about five minutes, a 2 per cent solution of antipyrin, followed in five minutes more by a very light insufflation of calomel, and finally by a protective spray of 1 per cent menthol in liquid vaselin.

Spiess[1] suggests a *new method of treatment for fresh coryza* which is based on the fact that the congestion of the nasal mucous membrane and the excessive secretion seem to subside during sleep. He ascribes this suspension of the symptoms during sleep to the diminished reflex action. The pathogenic agent causing the coryza, which during waking hours excites the mucous membrane to the point of swelling and excessive secreting, during sleep is unable to rouse the membrane to this point. The swelling subsides and the secretions are arrested. From this point of view treatment should aim to diminish the excitability of the mucous membrane during waking hours to the point

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(1) Archiv. f. Laryngologie, XII, 1.

of non-response to the irritation as during sleep. Drugs which reduce the reflex excitability or induce local anesthesia answer the purpose, such as the antineuralgics, especially salicylates and antipyrin, or orthoform for local application. He selected the latter as the simplest and most effective substance, and as catarrhal inflammation usually starts in the naso-pharynx and thence works upward, he treats it by insufflating orthoform into the throat and thence into the nose. Insufflation through the nostrils is ineffectual. The orthoform can be used pure or combined with equal parts of sodium sozoiodolate. The insufflations should be repeated several times a day or every hour until relief is obtained and the secretion controlled. He has been using this method of treatment for two years and recommends it with confidence as a remarkably successful means of aborting, arresting or curing a fresh cold in the head.

Chronic Rhinitis. Charles Grayson[1] holds that nasal catarrh is no more than a symptom of some dietetic disorder, or of some persistent disturbance of nutrition. Accordingly, he lays the greatest stress upon a critical attention to the patient's personal hygiene and environment. In coryza, rapid and thorough elimination will be the keystone treatment. The routine treatment with popular combinations of opium, belladonna, aconite, etc., is ill-judged. Locally, suprarenal extract with chloretone, as a spray, is particularly recommended during the stage of acute tumefaction and rhinorrhea. At the time of rapid epithelial desquamation and muco-purulent discharge, a spray of distilled extract of hamamelis, one part to three of water, supplies the mild astringency indicated. When active hyperemia has given place to sluggish venous congestion, Boulton's solution affords the proper stimulation. All applications must be preceded by an alkaline cleansing spray such as Dobell's. In the management of chronic hypertrophic rhinitis the author deprecates haste in resorting to destructive agents, advising the prior arrest of

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(1) Therap. Gazette, Feb. 15, 1901.

the underlying catarrhal process. Beginning with hamamelis and Boulton's solution, iodin in increasing strength from 1 to 30 in glycerine, is used until the tissues are no longer responsive. Light touches of fused chromic acid are now made to several of the more prominent points of the turbinate, and finally if cauterization becomes necessary, one or more slender lines may be drawn upon the lower border of the enlarged turbinate for about two-thirds of its length. The fibrinous exudate which follows should be allowed to remain undisturbed until it spontaneously loosens.

The treatment of *hypertrophic rhinitis* is discussed by M. Gaudier.[1] He reports ten cases treated by the submucous injection of zinc chlorid, the method first proposed by Hamm in 1898. He makes use of a hypodermic syringe of 2 cc. capacity, and a needle of irido-platinum. The strength of the solution employed was 1 to 10. Cocain was applied only to the spot where the needle was inserted. The needle was inserted in the anterior portion of the turbinate, as near the bone as possible. The fluid is injected slowly, while the needle is withdrawn. The floor of the nose is protected by a pledget of cotton. The reaction is not great. There is a certain amount of discomfort and swelling of the turbinate, which occludes the nasal passage completely. This is, however, of short duration, and after several days the turbinate has resumed its normal size. The results of treatment in these cases were not uniform, and the writer concludes that this method is not capable of replacing deep cauterization or resection of the turbinate.

Viollet[2] has followed Hamm's example and applied the *sclerogenic method of treatment* to chronic, diffuse hypertrophic rhinitis with very favorable results. He finds that it is successful only in those cases in which the mucous membrane is soft and swollen over the lower turbinate bones, easily compressible, smooth and even in appearance,

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(1) Gaz. des Hopitaux, Feb. 26, 1901.
(2) Gaz. hebd. de Med. et Chir., August 18, 1901.

obstructing the nasal fossa by its distention. He uses a very long needle, bent at right angles, and injects four or five drops of a 10 per cent solution of zinc chlorid. In rare cases he found it necessary to inject first the front and later the rear portion of the bone. In five out of eight cases followed to date the improvement has persisted more than a year. In two or three weeks the mucosa subsides to its normal size, leaving the passage unobstructed, in the favorable cases. True hypertrophy, thick and resistant, not compressible, is not amenable to this treatment, and to this fact is due the lack of success in certain cases reported by certain writers.

The following conclusions in regard to *surgery of the turbinal bodies* are drawn after many operations, by J. E. Boylan.[1] 1. While in exceptional cases involvement of the whole erectile tissue area of the pendulous portion of the turbinal body may coexist, hypertrophy is usually greatest where this tissue is most abundant, namely, at the anterior and posterior extremities. 2. The relief of obstruction and the reduction of hypertrophy is accomplished more certainly and scientifically by ablation than by cauterization. 3. While venous dilation is greatest at the posterior extremity, obstruction is rarely due to hypertrophy at this point alone. Removal with the cold snare is the method of operation advocated. The clean, smooth edge of the cut made by the transverse passage of the wire through the body, the small amount of hemorrhage, and the possibility of following the loop with the eye quite to the point reached, commend this method, and the use of the saw and scissors should be limited to cases with excessive induration, suggesting an exceptionally thickened bone. To prevent the slipping forward of the loop over the lower margin and medial surface of the body, the end of the loop may be fixed by burying the point of a fine tenaculum, the hook of which forms a right angle, into the lower margin of the turbinated body at the point of operation, carrying the loop over its handle into the meatus,

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(1) N. Y. Med. Jour., March 9, 1901.

and adjusting it so that it passes behind and is held in place by the back of the hook. The principle involved in turbinotomy is the radical removal of that part of the tissue which is the final cause of obstruction, and in which hypertrophy is farthest advanced, leaving the less affected part, which is to perform the function of the body, uninjured by the operative procedure. The indication is to remove as little tissue as possible consistent with freeing the passages from obstruction to respiration. A comparison of the results obtained by this method, and those from the cautery will operate to restrict extensive burning-out of the nose hereafter.

M. A. Goldstein[1] suggests a modification of the *submucous cauterization* of the inferior turbinate described by Pierce in November, 1896. To overcome possible difficulties in the introduction of the cup probe which carries the fused chromic acid, he has devised a special trocar and canula. The trocar can be locked in position in the canula, which last is provided with an adjustable sliding ring by which the length of the cauterization is regulated. The chromic acid bearing probe is introduced through the canula after the trocar is withdrawn.

Atrophic Rhinitis. T. S. Flatau[2] has cured two cases of fetid, atrophic rhinitis by *inducing a proliferation of tissue* at the hypoplastic regions in the nose. He accomplished this by implanting a row of small ivory nails along the point of insertion of the lower turbinate bone. In response to the mechanical irritation thus induced, the bone increased considerably in size during the next few months, with a corresponding alteration in the character of the secretions. Almost complete recovery was thus attained in both his cases. One or two of the nails were expelled after a few days or weeks.

C. M. Cobb[2] considers the treatment of atrophic rhinitis by electrolysis. He maintains that many cases of atrophic rhinitis have their origin in nasal empyema and whenever

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(1) Laryngoscope, May, 1901.
(2) Deutsche Praxis, 1900, 12.
(3) Jour. Am. Med. Assoc., March 16, 1901.

this is the case a sufficient amount of middle turbinate should be removed to improve the drainage. Careful search should be made for sources of pus in the accessory sinuses in all cases of atrophic rhinitis. He has used electrolysis in a number of cases of atrophic rhinitis, with needles of copper, platinum and steel, and thinks that "there can be no doubt that we have in interstitial electrolysis a remedial agent of undoubted efficacy, and that we may confidently expect from its use, in a large percentage of the cases at least, that the odor will cease, that the crust formation will be lessened, that the nasal mucous membrane will become moist and healthy in appearance, and that the secretion will become liquefied and lose its ropy, sticky character, and that these results will last for several months." Unfortunately, the author does not give the details as to where and how he applies his needles, nor the voltage and amperage which he is in the habit of using, nor the length of time or frequency of the sittings.

NASAL SEPTUM.

Inflammation. M. Lubinski[1] describes two cases of *acute, purulent perichondritis* of the nasal septum which show that the consecutive deformity from destruction of the cartilage can scarcely be avoided even by early, energetic intervention, unless the affection is diagnosed in the incipient stages. In one case a boy of 12 had experienced for seven years pains in the forehead radiating from the bridge of the nose over the right eye. This headache at last became continuous for six days, when a violent epistaxis occurred, with issue of black blood out of the left nostril, followed by asthmatic attacks and great depression. Both sides of the septum were tumefied and painful. The second patient was a woman of 36 who had been wearing a tooth plate over several carious stumps. The first symptoms of the perichondritis had been pains at the root of the nose, increased by stooping, and growing constantly

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(1) Deutsche Med. Woch., Sept. 9, 1901.

worse toward night every day. Treatment consisted in deep incisions on both sides of the septum, repeated as long as there was suppuration, supplemented by curetting and final tamponing of the nose. Cataplasms and inhalation of steam might possibly cure certain isolated cases, but more energetic treatment is generally required on account of the violence of the symptoms. Jurasz succeeded in curing one case of serous perichondritis by aspiration through a thick needle on each side. Schaeffer recommends, besides incision, the excision of an elliptical portion of the mucous membrane and perichondrium in order to prevent too rapid closure of the incision. Teets inserts in each nostril a silver tube, fitted to the shape of the passage, which not only supports the walls and drains thoroughly, but at the same time allows breathing through the nose during the entire course of treatment. Trauma, diabetes, erysipelas and a dental cyst have been noted in the etiology.

W. J. Freeman[1] enriches the rhinologic literature of the year by a valuable thesis on the nasal septum. The anatomic section of the paper includes a description of the "tubercle" of the septum which is situated below the anterior end of the middle turbinate and which is so frequently overlooked. Jacobson's organ is also mentioned. The embryologic development of the septum suggests some interesting questions. According to Disse, in the ninth month of embryonic life the hard palate lies above the level of the Eustachian tube-mouths; at birth it is on the same plane, while later it lies considerably below. This is due to the downward growth of the hard palate. Thus it appears likely that the elevation of the hard palate so often seen in adult life is a lack of development and is, therefore, an embryonic type. The high position of the hard palate in infancy is of practical interest, for the inferior meatus is thus nearly obliterated and the respiratory function is carried on chiefly through the upper part of the nose.

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(1) Laryngoscope, October, 1901.

Under the heading, "Diseases of the Septum," the author discusses more or less fully: 1. Deformity, deviations, ridges and spurs. 2. Hypertrophy, (a) of the tubercles, (b) of the septal folds, (c) of the mucous membrane in general. 3. Atrophy. 4. Hematoma. 5. Ulceration. 6. Vascular dilation. 7. Synechia. 8. Lupus, tuberculosis, syphilis. 9. Tumors. 10. Anomalies. The paragraphs which discuss deviation are the most valuable. Except in the instances where deformities of the septum are caused by traumatism or disease we must look upon them for the most part as the result of evolutionary, or, perhaps more properly speaking, of devolutionary changes. The chief cause of deviations is, Freeman thinks, the lack of development of the hard palate. In 302 cases of high arched palate there were 12 only where there was no marked deformity of the septum. Regarding the association of the Gothic arched palate with adenoids, Freeman believes adenoids to be one of the commonest and most manifest causes of lack of development in a child and, occurring usually at a time when the hard palate should descend, interfere with this and almost invariably lead to deformity of the septum.

Deflections.—Operations. The Roe operation is described by its originator.[1] The instrument used is a fenestrated forceps, one blade of which is made in the form of an ovate ring, and the other in the form of a long, narrow, rounded blade which fits loosely into the former so that the septum is not unduly compressed or lacerated. The handle is sufficiently long to avoid compression of the frenum of the nostril when the face of the blade is applied to the septum. The male blade is inserted into the nostril on the convex side of the deflection, and the ring blade on the opposite side. Then by closing the blades the deflected portion is crowded into and partly through the opening—far enough to forcibly indent the central portion and fracture it without disturbing or bringing a strain on other portions of the septum. In straightening

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(1) N. Y. Med. Jour., April 13, 1901.

a deviated septum, no matter if the deviation be confined to the cartilaginous portion alone, it is of the utmost importance that the bone at or adjacent to the attachment of the cartilage, be fractured. In this way the change in the direction of the attachment of the cartilage is made in the bone, so that it permanently holds the cartilage in its new position. This method is also of service in cases of moderate deviation of the cartilaginous portion alone, by simply fracturing the adjacent part of the cartilage into the fenestrated blade. The most satisfactory support for holding the septum in place is a plug made of sterilized cotton or gauze, wrapped around a small metal plate to give it firmness, and of the requisite size to fill the nostril completely. It is placed in the previously occluded nostril or the convex side of the previously existing deflection. The author further discusses the method of incising the cartilage to provide for redundancy, and the details of the operation for straightening the septum.

A report of twenty-two cases of deflection of the septum operated on by the *Asch Method* is presented by G. King.[1] His results were uniformly successful, most of the patients having been discharged cured, a few, owing to individual circumstances, having been greatly relieved, but not entirely cured. He summarizes his work under the following six heads.

1. Selection of cases. This method is particularly indicated in children and in nervous patients who cannot stand an operation under local anesthesia. It has the disadvantage, however, that the blades of the scissors are too large for convenient introduction into the occluded nares. In such cases he made a crucial incision with a strong pointed bistoury.

2. Preparation of the patient. An alkaline, antiseptic nasal douche is used three times a day for two or three days before the operation. Before introducing the cutting instrument the nasal fossa is sponged with a tampon dipped in a weak solution of bichloride of mercury or

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(1) Revue hebdom. de Laryng., Jan. 5, 1901.

carbolic acid. Suprarenal extract is a good hemostatic.

3. Choice of anesthetic. Chloroform is the best. A local application of ten per cent cocain solution sometimes suffices.

4. Position of the patient. The hemorrhage is so easily prevented by suprarenal extract that it is possible to lay the patient flat on his back.

5. Care in the use of instruments, selection of splints, etc. Only two instruments are absolutely necessary, a pair of Asch's scissors or a bistoury, and an Asch's forceps. It is best to have duplicates at hand, also a periosteotome and a probe to tampon the cavity with gauze if it becomes necessary. The modified vulcanized tubular splints of Mayer are usually satisfactory. Care must be taken in introducing them as it is very easy to catch one of the edges of the wound and push it to the bottom of the cavity, so that it fails to unite with the other edge, and results in a perforation.

6. Post-operative treatment. It is advantageous to spray the nose frequently during the first twenty-four hours with an antiseptic solution. The tube is then removed from the unobstructed side and the patient allowed to go home if all is well. An alkaline douche is ordered every four hours. Three or four days afterward the other tube is removed and the cavity douched. The tube is replaced, and for eight to ten days the patient's nose is douched regularly and examined every two days. At the end of this time the wound is usually healed, and the tube can be removed. Lavage and anointing with boric acid vaselin is continued until cicatrization is complete.

Another method for treating deflected septum is given by E. B. Gleason,(1) who regards it as especially valuable for cases of deflection of the cartilaginous portion of the septum. A U-shaped flap is sawed out of the deflected portion, its resiliency destroyed at the point where it is left attached above, and the free portion then pushed through into the previously open side. A tube is inserted in the previously occluded side for twenty-four hours. Full details for doing this operation are given. "The writer claims for his method of operating that the shape and position of the septal flap enable an operator to overcome resiliency more certainly than by any method previously described."

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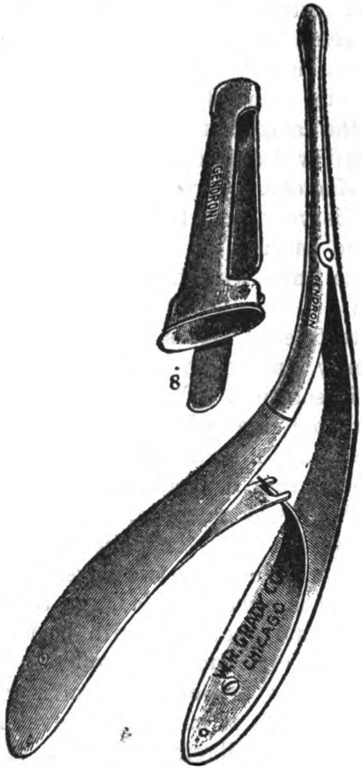
(1) Jour. Am. Med. Assoc., March 9, 1901.

Moure[1] suggests an *improvement upon the operation of*



Figs. 18, 19.

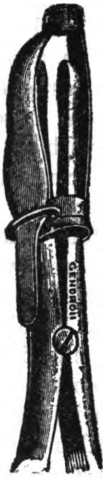


Fig. 20.

Fig. 18. Metallic tube with rigid wall to the left, soft and flexible to the right, for introduction on the side of the deviations. The portion which depends is intended to be recurved at entrance of nostril to insure retention in position.

Fig. 19. Dilating forceps to mould tube against deviated cartilage.

Fig. 20. Forceps placed inside tube to make desired moulding.

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(1) Jour. of Laryngol., April, 1901.

Asch in deviated septum. If a spur or thickening of fibro-cartilage exist, it is first removed by means of an instrument which consists of a much elongated ring whose ellipsoidal extremity has two opposed cutting edges. These blades are concave externally and very convex on the other side. The lower (proximal) portion of the ring is blunt. The bleeding is stopped by means of the cautery knife. If there is luxation of the fibro-cartilage at the antero-inferior part of the septum it is resected with a bistoury and the cut mucous membrane sutured. When these wounds have healed and cicatrized—in about a month—the deviation is attacked. After cleansing, under 10 per cent cocain anesthesia, the septum is incised for two or three centimetres close to and parallel with the floor by means of scissors resembling those of Asch. The second incision through the cartilage is made at an acute angle to the first near the front of the nose, so that there exists a movable fragment which is held in front by the ante-

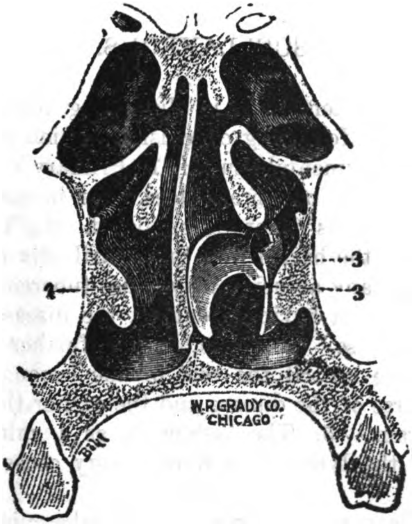

Fig. 21.

rior part of the base of the septum, which has been left untouched towards the tip of the nose, and behind by the perpendicular plate of the ethmoid and the vomer. Moure then introduces a special metal tube dilator formed of two parallel blades of which the outer is rigid, the internal one longer and malleable, the malleable blade resting on the septum. This is left in position for seven or eight days and then removed for good. Warm boracic solutions are frequently used at first, and the patient can generally resume his occupation after three days. See Figs. 18-21.

MISCELLANEOUS.

Tuberculosis. Renshaw,[1] in discussing nasal tuberculosis, reaches the following conclusions which are in part based upon experimental study: 1. Primary tuberculosis of the nasal mucous membrane does occur in man and not so infrequently as is generally supposed. 2. The simple introduction of the bacilli into the nostril of a susceptible animal without any abrasion may cause tuberculous infection. 3. Infection having occurred, the disease tends to run a slow course. 4. Probably the farther from the entrance of the nostril the seat of the lesion, the more rapid the course of the disease and the earlier the invasion of other organs. 5. The system is, as a rule, invaded by means of the lymphatics though very occasionally by other routes.

W. L. Ballenger[2] reports a case of tuberculosis of the septum in which the diagnosis was verified by inoculation experiments.

Leprosy. P. H. Gerber[3] compares the nasal secretions in leprosy to the sputum in tuberculosis as the principal means of communicating the disease, only, he adds, the lepra bacilli are much more constant, more numerous and more resistant in the nasal secretions than the tubercle bacilli in the sputa. The nose and throat in leprosy de-

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(1) Jour. Pathol. and Bacter., Feb., 1901.
(2) Laryngoscope, 1901.
(3) Archiv. f. Laryngol., XII, 1.

mand especial attention in order to render them harmless to others.

Syphilis. In a case of probably syphilitic necrosis of the nasal bones and a chronic nasal affection described by G. Heermann,[1] a portion of the upper jaw was resected on account of periostitis. Not long after this the patient, a man of 38, found that he could breathe through his nose for the first time in many years. Heermann, who reports the case, found that the nose was completely obstructed and that the air entered through the maxillary sinus, which opened broadly into the nose, while an aperture of communication was also found in the mouth in the alveolar process below.

Epistaxis. C. N. Cox[2] writes of the *etiology, pathology and treatment* of epistaxis. While usually due to some lesion within the nasal cavity, it may arise from some systemic condition such as plethora, anemia, or organic disease of the heart, lung or kidney. When due, as in the majority of cases, to an intranasal lesion, the ultimate cure is dependent on the localization and removal of the lesion. Mechanical pressure by tampon, directly to the bleeding point is the most effective treatment, while if the point of bleeding is not visible, plugging the whole nostril may be resorted to and in very unusual cases, the introduction of a posterior plug. The author strongly condemns the use of that "time honored abomination, Monsell's solution," the frequent cause of suppuration and sepsis by the formation of hard, plaster-like coagula. As local astringents and styptics he recommends the employment of, suprarenal capsule, either in powder to the bleeding point or in solution as a spray, a 20 per cent solution of ferropyrin in water, which may be sprayed freely into the nostril without fear of harm, antipyrin in 4 per cent aqueous solution, alum, two drachms to four ounces of water, and the peroxid of hydrogen. When applicable directly to the bleeding point, the author sanc-

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(1) Archiv. f. Laryngol., XI, 3.
(2) Medical News, April 20, 1901.

tions the use of the solid stick of silver nitrate, or the galvano-cautery.

L. S. Somers[1] recommends the use of the suprarenal extract in persistent epistaxis. He adds one grain of pure carbolic acid to a dram of sterile water containing ten grains of adrenal, and filters. The resulting solution retains its maximum efficiency and is both sterile and permanent. Eucain may be added with advantage in strength of 1 to 3 per cent. For epistaxis, pledgets of cotton, saturated with the solution are applied to the bleeding point. The surface is blanched and the muscular walls of the arterioles contract so that blood cannot flow through them. Two cases are reported.

G. Coates[2] reports five cases of *profuse epistaxis in people beyond middle age* and discusses their causation and treatment. In all, the sequence of events was the same—(a) long continued high arterial pressure; (b) some sudden cardiac failure; (c) overfilling of the whole venous system, and (d) leakage from an overfilled vein. The scientific treatment is to empty the overfilled veins as by nitroglycerin, nitrite of amyl, etc., afterwards erythrol tetranitrite, and when the capillaries are dilated and pervious, strychnia and strophanthus. Plugging will be avoided in most cases.

Neuroses. W. Fliess[3] has continued his researches and experiences on the *relations between the genital point in the nose and the sexual organs.* He relates a number of cases of dysmenorrhea cured by cauterizing the genital spot, and states that labor pains are also susceptible of being controlled by this means. In fact, he proclaims, the nose is a station on the route travelled by the pain stimuli on their way to the brain. Not all the pains pass this way, but only those which correspond to the excitation of certain spinal segments. The pains in the sacral and abdominal regions in dysmenorrhea and the sacral labor pains which irradiate into the hypogastrium, can be

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(1) Phil. Med. Jour., March 2, 1901.
(2) Lancet, April 20, 1901.
(3) Samml. zwanglosen Abhandl. Nasen etc. Krankh., v, 8.

abolished by cocainization of the genital spot in the nose. Only that form of dysmenorrhea is influenced in which the pains persist after the flow is established. He considers that parturition is in its essence an exaggerated menstrual process, and that the true labor pains are the exaggeration of the nasal dysmenorrhea. It is also possible to arrest pain from other segments of the spinal cord by cocainization of a certain point in the nose, as he has frequently confirmed in case of infectious herpes zoster, etc. In this connection, too, A. Schiff[1] reports observations on forty-seven cases of dysmenorrhea. Among these there were thirty-four, in whom, hysteria excluded, the pains were relieved on cocainization of the genital area in the nose, not only once, but repeatedly.

H. N. Hoople[2] presents a paper on a nasal condition affecting the ocular muscles. His thesis is that "faulty pressure within the nose can cause asthenopia of both the ciliary and external ocular muscles" when such pressure exists in Mackenzie's "reflex area" affecting chiefly the middle turbinated body, the adjacent septum and the ethmoid cells, when compressed by simple mechanical means (such as spurs or displacement), or by swelling, the result of inflammatory action. The hemicrania found in these cases is dependent, as shown by Loeb, Snow, and others cited, on the same condition of pressure, but is not itself a symptom of asthenopia. The two are concomitant, dependent on the disturbance of the same sensorimotor branches of the fifth nerve. Reference is made to cases reported by Maxwell and others, in which accommodative asthenopia was cleared up by treatment of the nasal fault, and also to cases by de Schweinitz and Ziem, in which muscular asthenopia was found to be dependent on pathologic conditions in the same area, that is, the presence of sinusitis, and which disappeared when the pathologic conditions were removed.

The author cites six cases belonging to the restricted

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(1) Wiener klin. Woch. No. 3, 1901.
(2) Med. News, July 27, 1901.

type of patient, named by Gradle the *normal asthenope*, and rests his thesis on this type alone, excluding cases of the less conclusive neurasthenopic type. Case V shows changes in behavior of both ciliary and external ocular muscles, brought about by mere mechanical pressure in divulsion of tightly pressing middle turbinates. Cases VI, VII, and VIII record changes in the same muscles tested thoroughly before and after treatment by ablation of a tightly compressed middle turbinate. In these cases, coincidental with the removal of the symptoms of asthenopia, there was the disappearance of the accompanying hemicrania, the symptom most in evidence to the patients.

H. N. Poole[1] presents the history of four cases in which he removed the middle turbinate with the effect of immediate improvement of muscular asthenopia, which had resisted other and more usual methods of treatment. It seems a logical induction from the facts presented, that muscular asthenopia is frequently a reflex effect from the nasal mucous membrane, "a matter of disturbance of innervation of the ocular muscles by irritation of a particular area of nerve distribution in the nasal mucosa." Ablation of the middle turbinate removed this irritation. The author thinks that a larger proportion of anomalies of the ocular muscles is dependent on this form of disturbance than has been generally suspected.

R. Sattler[2] notes the symptomatology of these reflex disturbances of the ocular muscles. Chronic lesions of the anterior region of the middle turbinate, the anterior ethmoid cells, etc., have two principal clinical expressions. 1. Persistent injection of the vessels of the ocular conjunctivæ, with prominence and distention also of the muscular branches, often accompanied by passive edema of the retrotarsal folds. Sometimes there is retraction of the upper lid, and a peculiar stare. 2. Prolonged and severe suffering from continued effort in reading or close work. It is more pronounced early in the day and wears

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(1) Medical News, April 13, 1901.
(2) Jour. Am. Med. Assoc., May 18, 1901.

off. It is of a neuralgic character and is referable to various points about the orbit. These patients are usually neurasthenics. Cases of chronic suppuration in the inferior meatus, ethmoid cells or sinuses require a radical extirpation of the tear sac by cauterization or excision, with or without removal of the lachrymal gland. Every vestige of fistulous tracts should be removed.

A remarkable case of nasal reflex neurosis is reported by B. Lewy.[1] The patient exhibited the symptoms of a severe neurosis for years, trembling, insomnia, pains in limbs and sacral region, difficulty in breathing, etc. Several polypi were found and removed from the nose, but the nervous symptoms persisted unabated until a projecting portion of the mucous membrane over the right lower turbinated bone was excised. The patient was at once relieved from all the nervous symptoms and has shown no sign of recurrence to date. The excised scrap of mucosa contained a nerve with 110 fibers, some of the branches quite large. Almost all were within .3 mm., one, .16 mm., from the external surface of the mucous membrane. The nerves did not seem to be degenerated. In a similar case in a woman of 50, an intractable, boring headache ceased completely after excision of a swollen portion of the mucosa over the right lower turbinate bone. The excised scrap contained a number of nerve ramifications only .2 to .4 mm. below the surface.

Nasal Hydrorrhea. J. Molinie,[2] in a twenty-page article, establishes the following conclusions. I. Nasal hydrorrhea, as a morbid entity, has ceased to be. II. Instead, two groups of causes for the secretion are recognized, limited by the rôle played by the pituitary body. III. In the first group the nasal mucous membrane acts directly in producing the secretion, but by varying mechanisms according to the cases, and under various general and local influences. IV. In the second group the nose acts only as a passage for the secretion which

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(1) Archiv. f. Laryngol., XII, 1.
(2) Rev. hebd. Laryng., d'Otol., Rhinol., May 18, 1901.

may come (a) from the brain, thus revealing a more or less grave pathologic condition within the head, or (b) from the sinuses, in which case it depends on a new growth or a hydrops of these cavities. V. Nasal hydrorrhea, whatever its point of origin, is always a secondary phenomenon, never essential and primary. VI. It is necessary then, when confronted with the symptoms of hydrorrhea, to point out the causes, or at least the source, of the secretion, before we can thoroughly understand its significance, or formulate the therapeutic indications in each particular case.

As to the pathogeny of nasal hydrorrhea in spasmodic coryza, Brindel[1] gives as a result of the most careful histologic examination of the mucosa in many cases, the following conclusions: The liquid flow during a crisis (of coryza) is not to be attributed to an exaggerated glandular secretion, since the microscope reveals a total absence of glands from the hypertrophied mucosa in 77 per cent of the cases. Instead of being a secretion, nasal hydrorrhea is rather a transudation of blood serum, through the meshes of the connective tissue of the mucosa, a kind of edema with immediate excretion of the extravasated fluid. The microscopic examination establishes the following: (1) an accumulation of round cells in the neighborhood of the epithelium and a corresponding desquamation at the time of crisis; (2) a considerable multiplication of blood vessels, and venous engorgement; (3) extravasations throughout the mucous tissue, particularly toward the outer surface. As to the primary cause of the edema, or the exact pathogeny of the vasodilation producing it, the author offers no explanation, but is content to affirm that glandular tissue counts for almost nothing in the production of nasal hydrorrhea in spasmodic coryza.

Abate[2] reports five *typical cases of vaso-motor coryza* in which there was no demonstrable disease or abnormality of the nose. He found orthoform insufflation to be useful.

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(1) Rev. hebd., May 25, 1901.
(2) Boll. d. Mal. dell'orechio, etc., Nov., 1900.

TUMORS.

Polyps. J. Wright[1] argues against the assumption that polypi are myxomatous in character. On the contrary, most polyps consist of a normal amount of loose areolar tissue, infiltrated and stretched with serous exudate, and do not contain fibrous tissue to any extent, nor are they proliferations of embryonal, nor of any other kind of tissue. This error of calling mucous polypi myxomatous is found in many of the text-books.

Dermoid Cyst. H. S. Birkett[2] reports two cases of dermoid cyst of the nose. The first occurred in a boy aged sixteen. At birth it was noticed that there was a small round lump of the size of a pea on the nose near the tip. This remained so for twelve years, when it burst and gave exit to a small quantity of thick, curdy-looking pus. The opening was enlarged and the lesion curetted. This healed temporarily, but the lump again appeared and broke and continued to discharge. A skiagram showed a fine dark line, extending from the center of the opening directly upward and backward into the septum. The sinus was opened and freely curetted, and solid nitrate of silver applied. At the distal end, several fine hairs were found close to the opening. The wound was allowed to heal up from the bottom, and the result finally was very satisfactory. The second case occurred in a boy eight years old, who had had a growth on his nose since birth, which had recently increased in size until it extended from slightly above the line of the eyebrow to about the center of the nose. A skiagram showed no deep involvement, and no separation of the nasal bones. The cyst was incised and the wall carefully dissected out. The opening closed completely, leaving an almost imperceptible scar. Photographs of both cases, before and after operation, are shown.

Cystic Angioma. H. L. Wagner[3] describes two cases

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(1) Medical Record, Jan. 26, 1901.
(2) N. Y. Med. Jour., Jan. 19, 1901.
(3) Phila. Med. Jour. of March 2, 1901.

of this rare form of nasal growth, one in a boy of 9, and the other in a woman of 28. Both presented practically the same conditions. The nasal passage shows a single bluish-gray tumor, entirely occluding the posterior nares on one side, and protruding somewhat into the nasopharyngeal vault. The feeling under the probe is very characteristic, this tumor showing a greater elasticity of its outer walls than any other found in this situation. It is very movable and attached to a small base apparently a little distance below the spheno-palatine foramen, where the artery and vein of the same name enter the nasal cavity. During and after extirpation of the tumor, a light brownish fluid escaped, leaving a very thin collapsed sac of a sausage form. If the seat of the cyst is not thoroughly destroyed it will rapidly form again. In sections of the cyst wall diametrically cut, it was seen to be covered by a ciliated columnar epithelium, except in one region where the epithelium was squamous. No glands were found in any of the sections, but a large number of venous blood vessels, some of them enlarged and running parallel with the long diameter of the sac,—also some large venous sinuses were seen. As these vessels and sinuses constituted the principal elements of the cyst wall, the writer has used the name angioma cysticum. The cyst fluid was examined chemically and found to represent a blood transudate.

Angio-fibroma. J. E. Newcomb[1] reports a case of angiofibroma. The patient, a man, aged 21, had complained for seven months of nasal stoppage. Examination showed what appeared to be a polypus of the left middle turbinate. Two attempts were made to remove the growth with the cold snare, but it pulled the wire out of the canula the first time, and the second time the wire broke. At a subsequent attempt a small piece had been removed, but the operation was attended by extremely profuse bleeding.

Bone Cysts. A. Sundholm[2] describes three cases of bone

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(1) Laryngoscope, May, 1901.
(2) Archiv. f. Laryngol., etc., XI.

cysts occurring in the middle turbinate bone. In one case the symptoms were merely those of obstruction; in the others, the patients were disturbed by attacks of dyspnea at night. He has been able to collect sixteen cases in the literature; all but three of the patients were women, usually between 20 and 40 years of age. The symptoms usually resemble those accompanying inflammation of the accessory nasal cavities, especially the ethmoid cells and frontal sinus. The pains irradiate into eyebrow, eye and teeth, with headache on the affected side and tendency to nightmares. Only two cases are known of bilateral cysts of this kind. In size they vary from that of a bean to a hen's egg. In one case the cyst was 7 cm. in diameter, with the mucous membrane over it in polypoid degeneration. The cysts ordinarily contain merely air, but occasionally pus, mucus or polypi have been found in them. They are evidently of congenital origin, he thinks, and are in reality abnormally developed and misplaced ethmoid cells. They may occur without symptoms of any kind and only attract attention when pathologically altered by a concurrent rhinitis.

Primary Adeno-Carcinoma. A case is reported by Polyak.[1] The patient had presented himself a year and a half before with a growth in one superior meatus, which on microscopic examination was found to be a pure papillary adenoma. A change soon took place and the microscope showed carcinomatous metaplasia. In the late course of the affection the mass grew into the other nasal passage and into the orbit. The autopsy showed metastases in the cervical lymph glands, lungs, ribs, liver and spleen. The age of the patient and other clinical details are not given.

Miscellaneous. The rôle of the *nasal fossæ in the prophylaxis and treatment of pulmonary tuberculosis* is discussed by Maurice Mignon (British Congress on Tuberculosis). When we consider the question of the prophylaxis of tuberculosis, we must recognize the fact that contagion takes place chiefly through the air. Air is the vehicle by which the microbes invade the organism far more frequently than food, which can be sterilized by cooking. When the air is still infective, in spite of the use of spittoons, in spite of the practice of disinfection, in spite of every precaution designed to prevent the spread of disease, the nasal fossæ are still capable of arresting the danger that threatens us. The bacilli that enter with the air are in large measure arrested by the cilia of the nasal vestibule, and by the very extensive and very irregular surface of the mucous membrane. One may thus recognize the bactericidal function of the nasal mucus, although it has been questioned by some authors. Clinical experience teaches, indeed, that the nasal fossæ are much more resistant to tuberculosis than the rest of the respiratory tract, and even than the bucco-pharyngeal cavity. Insufficient nasal permeability (nasal obstructions from malformations of the septal ridges, from hypertrophic or congestive rhinitis, from cysts, vegetations, adenoids and the like) may therefore be considered to increase the likelihood of tuberculous invasion. From the point of view of treatment the state of the nasal fossæ is of equal importance. As the nose allows more air to enter than the mouth, nasal insufficiency results in deficient oxidation of the blood, and everyone knows how necessary oxygen is to the tuberculous. Entering by the mouth the air brings with it harmful microbes, which, accompanied by dust, favor the malady. Moreover, this air, insufficient and injurious, is unmodified either in temperature or pressure. It provokes bucco-pharyngeal, laryngeal, and tracheo-bronchial inflammations which impede the action of treatment.

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[1] Pester Mediz. Chirurg. Presse, 1909, No. 51.

It is therefore absolutely necessary that we should be satisfied that patients presenting themselves for examination (especially those disposed to tuberculosis or who are already tuberculous) are not suffering from any form of nasal insufficiency. If any defect is present it should be remedied, and we should enjoin the patient to breathe solely by the nose as soon as he is able, for in this, habit often plays a part. Instruction on the latter point should be included in the general advice which one makes a point of disseminating amongst all classes of the population.

C. M. Cobb[1] thinks that most cases of *cervical adenitis have their origin in purulent inflammation of the upper air tract,* either consecutive to adenoids, enlarged tonsils, or from purulent rhinitis occurring independently of these, or even subsequent to the operation for adenoids and enlarged tonsils. He cites a case in which after a thorough operation for the removal of adenoids and enlarged tonsils, a purulent discharge from the nose, and a cervical adenitis followed a coryza. He thinks that the source of the infection should be sought in these cases, and that the physician should not be content simply to remove the enlarged glands. He regards the assigning of tuberculosis or scrofula or the asthmatic diathesis as the causative factor in these cases as meaningless statements. He is of the opinion that most cases of purulent rhinitis are secondary to disease of the accessory cavities of the nose, and makes a plea that in all cases of enlarged glands in children, a search be made for the cause.

Writing on *nasal conditions observed in the aged,* B. Douglass[2] states that he has noted in his practice that very few people over fifty years of age seek advice for the relief of nasal troubles, while the majority of patients who do, either at the hospital or in private practice, are between the ages of sixteen and forty years. In old age with its decreasing vitality, the liability to disease is not diminished, and we should expect the aged to complain of the symptoms of nasal and pharyngeal affections. The reason for the fact that so few old people seek relief from such conditions, the author believes, must be, that although the lesions are present, they do not cause the symptoms to which they give rise earlier in life. Five cases are cited in which distinct and even marked changes were found

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(1) Boston M. and S. Jour., Jan. 10, 1901.
(2) N. Y. Med. Jour., May 25, 1901.

upon examination, in none of which did the patient complain of any symptoms. It is also shown that the symptoms of discharge, pain or obstruction are not in proportion to the amount of lesion present, but in certain cases may be entirely absent, in the presence of well developed lesions; that chronic congestive obstructive interference with circulation, lymphatic obstruction, and neurotic temperament are very important elements in nasal cases; and that the cure of the patients who suffer from nasal symptoms will often result from mere mechanical removal of the lesion present in the nose. The author believes that some of these cases may be explained on the ground that the changes take place so gradually, and yet so constantly that the lesions present in the nose may be from internal blood or lymph irritation, while active inflammatory symptoms, such as obstruction from the paralysis of blood vessels, discharge and pain, may be entirely absent.

A peculiar case of *migratory foreign body* is reported by D. B. Kyle.[1] It is of unusual interest on account of the complicated and varied symptoms which were presented. The marked symptom in each attack was severe neuralgic pain, but the site of the pain, soreness and swelling changed frequently. At times the attack would simulate mastoiditis, again ethmoiditis, and lastly all the symptoms of confined suppuration of the maxillary sinus. When the attack was over there was such an absence of symptoms that it was impossible to locate any special diseased area. The first attack occurred in January, 1887, and lasted nine weeks. There was a sensation of something crawling underneath the scalp, that seemed to extend from the back of the neck forward over the top of the head. In December, 1898, the attack was almost identical with confined suppuration of the frontal sinus. There was a profuse discharge of pus from the nostrils and a small piece of needle was expelled on forcibly blowing. This was followed by a cessation of the crawling sensation.

When first seen by the writer, almost a year later, there

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(1) N. Y. Med. Jour., Jan. 19, 1901.

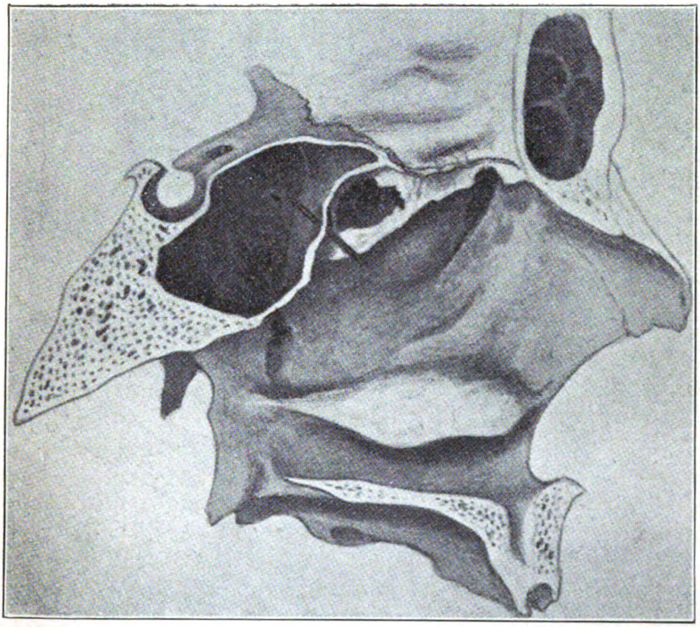

PLATE VIII.

Sphenoid Sinus. B. Douglass' Article.

(Laryngoscope.)

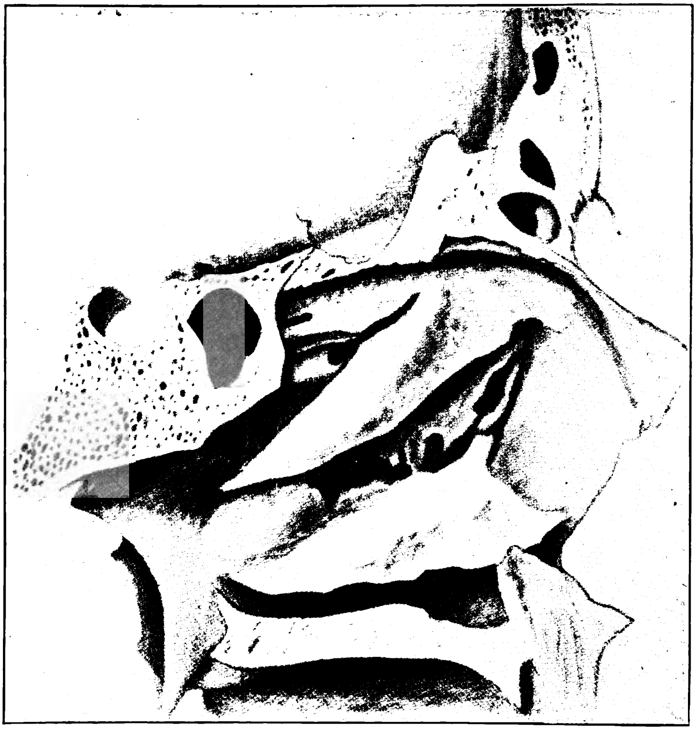

PLATE IX.

Sphenoid Sinus. B. Douglass' Article.

(Laryngoscope.)

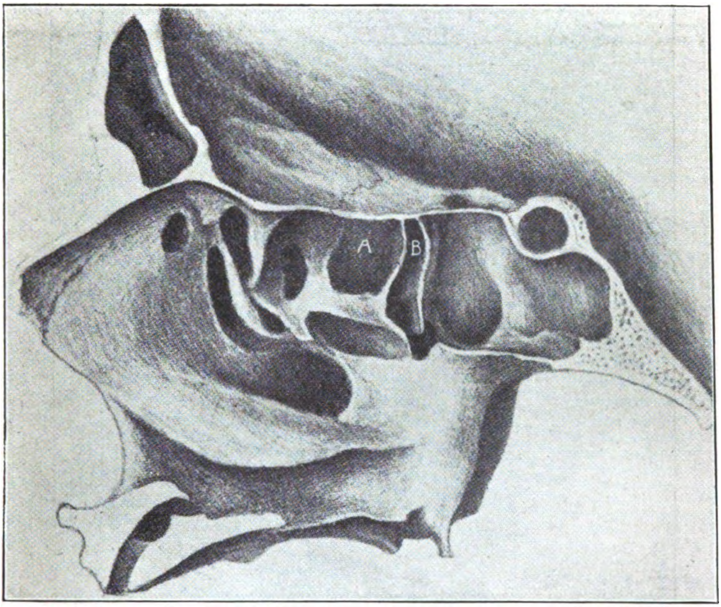

PLATE X.

Sphenoid Sinus. Two Cells in Small Sphenoid Wing. B. Douglass' Article.

(Laryngoscope.)

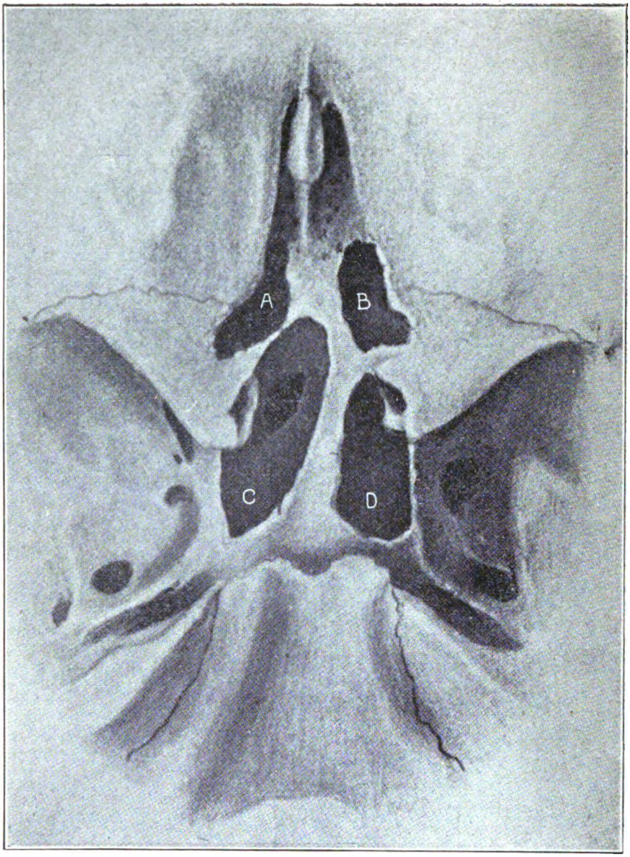

PLATE XI.

Posterior Ethmoid Cells Extending into Small Wings—Cranial View.
B. Douglass' Article.

(Laryngoscope.)

was pronounced swelling on the right side of the face, reaching the antrum, and up into the orbit, and at the base of the nose. An X-ray picture was taken which showed that a foreign body was present. Exploration of the antrum failed to detect it, however. A few days later there appeared, about a quarter of an inch back of the opening that had been made into the antrum, a swelling that looked much like an ordinary gum boil. This was opened, and on examination the point of a needle was discovered projecting from the tissues. This was readily removed with a pair of scissors, and since that time the patient has had no symptoms. It could not be ascertained how the needle had entered.

THE ACCESSORY CAVITIES.

Anatomy. B. Douglass[1] contributes a valuable addition to our knowledge of the anatomy of the sphenoid bone. His paper describes for the first time the frequency, topography, relations and size of the smaller pneumatic sinuses in the sphenoid wings and his conclusions based upon the study of 200 cases are as follows: 1. The great sphenoid cavity may occupy only the body of the sphenoid without extending into the small wing,—thirty-one times. 2. The greater sphenoid cavity may occupy the body of the sphenoid, and other pneumatic cells, with a nasal communication and lined with mucous membrane, may develop in the small sphenoid wings,—seven times. 3. The great sinus may develop in such a way that it occupies one-half the sphenoid body and extending into the sphenoid wing may occupy it entirely or partially,—169 times. 4. The great sphenoid cavity may occupy the body and extend partly into the wing, in which case the whole or a part of the posterior ethmoid cell may extend backward into the small wing of the sphenoid. The sinus of the small wing in these cases is not developed,—forty times. 5. The greater sinus develops in the body of the sphenoid; the sinus in the small wing is also present. These sinuses of the small wings communicated on one side with the posterior ethmoid cell and on the other side with the recessus sphenoidalis. The relations of these sinuses of the small wings are important. Above lies the brain, the optic nerve and the optic chiasm, below the nasal mucous membrane and anterior part of great sinus, anteriorly the posterior ethmoid cell; externally the optic nerve runs over the convex outer wall and when the sinus is large it may have here an important relation with the carotid artery and occasionally with the vidian nerve and wall of the orbit so that an encysted empyema of this sinus may cause optic nerve paralysis, press upon the carotid, paralyze the vidian or sometimes cause orbital pressure. The operator upon the posterior ethmoid cell may reason erroneously in case his instrument enters this sinus. If his instrument perforates a thin wall he may incorrectly believe that he has entered the brain cavity or great sphenoid sinus. The paper is well illustrated. See Plates VIII to XI.

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[1] Laryngoscope, Feb., 1901.

A. Onodi calls attention to the possibility of *direct communication between the maxillary sinus and the ethmoid or sphenoid cells,* or both, by abnormal recesses in these sinuses, which extend to encroach on others, with an aperture of communication or a dividing wall so thin that it is easily perforated. In one case that he illustrates, the sphenoid sinus was 3.7 cm. high by 4.7 wide and 3.5 long, while the maxillary sinus was 4.2 cm. long by 3.6 wide, with the dividing wall only 1 cm. thick. The lowest portion of the sphenoid sinus was on a level with the posterior portion of the middle turbinate bone. In another case the wall separating the two sinuses was only 4 mm. thick. In another skull he found a recess in the sphenoid sinus 3.5 cm. high and 2.2 cm. long, extending forward into the lamellæ of the nasal septum for 1.5 cm. In others, the recess in the maxillary sinus extended upward and formed the floor of the posterior ethmoid cells for a distance of

6 mm. in one and 9 mm. in another. Study of sections of twenty skulls showed remarkable diversity in the arrangement of these sinuses and revealed the possibility of secondary empyema of the maxillary sinus in case of suppuration in the frontal sinus and anterior ethmoid cells, as the pus can easily settle down into the antrum of Highmore. The same result may follow empyema of the posterior ethmoid cells and sphenoid sinus by perforation of the thin dividing wall. Jansen makes a practice of curetting the ethmoid cells and opening into the sphenoid sinus through the maxillary sinus when evacuating the latter, in nearly every case. He also systematically treats the sphenoid sinus through the ethmoid cells in most of his operations on the frontal sinus.

Suarez de Mendoza[1] describes three cases in which he discovered supplementary frontal sinuses behind the normal ones, each with a separate communication with the nose. Some of them were larger than the normal sinus. Two similar cases have been published and he found anomalies of this kind in several cadavers. In one skull a pear-shaped sinus on each side, about 2 by 3 cm. in size, was separated from the normal sinus by a thin wall with a very small opening. The persistence of the sinusitis in one of his cases after supposed complete evacuation led to the discovery of the supplementary cavities behind, in which the inflammation still continued.

Etiology. E. L. Vansant[2] makes special mention of *closure of the natural outlet as a causative factor in sinusitis.* Swelling or thickening of the mucous membrane, the formation of small masses of granulations or even the presence of inspissated mucus may be the cause of the obstruction. Such closure of the outlet may lead to sinusitis, or to a chronic congestion of the lining membrane. Headache of a dull boring character is the most prominent symptom of these affections. The pain is usually well localized, though more than one locality may be affected

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(1) Progrès médical, Jan. 19, 1901.
(2) Jour. Am. Med. Assoc., May 18, 1901.

at the same time. The pain is usually increased when the patient "catches cold." Inspection of the nares will frequently reveal the cause of the obstruction, which, of course, we seek to remove. Most gratifying results have been obtained in these cases by forcibly syringing the opening with hot air used under pressure. The air is used as hot as the patient can bear it, and under a pressure of from thirty to forty pounds. The nasal chambers are thoroughly cocainized and this followed by the application of extract of suprarenal capsule. Acute sinusitis treated in this way, aided by hot applications externally, low diet, attention to digestion, etc., will usually yield in a few days.

M. H. Cryer[1] does not believe that the general impression of the medical and dental professions that the majority of cases of antrum disease are brought about by infection from diseased teeth is a correct one. Developmentally the sinuses are related to the nasal cavity, and the teeth to the mucous membrane of the mouth. In nearly all cases abscesses about the teeth have their fistulous openings into the mouth. The author illustrates this by a number of original dissections. He expresses the opinion "that it is through the common communication between the frontal sinuses, the ethmoid cells, and the maxillary sinus that infection is generally conveyed to the antrum from the cells and sinuses above it, recognizing at the same time, that the posterior ethmoid and sphenoid cells of the orbital process of the palate bone can also infect the antrum by resorption of the partition between these cavities. There are more cases in which teeth are lost through disease of the antrum, than cases in which the teeth are primarily diseased, causing infection of the antrum and associated cells."

Diagnosis. T. L. Shearer[2] emphasizes the *lack of absolute reliability of transillumination* as a means of diagnosis in sinus disease. He takes exception to the remark of

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(1) Jour. Amer. Med. Assoc., Nov. 24, 1900.
(2) Jour. Electro-Therap., April, 1901.

Ruault, that "we can have opacity without empyema, but we cannot have empyema without opacity," for, he says, in empyema the light may be thrown into the nasal cavities by means of some anatomical formation of the hard palate and not through the narrowed antrum. He cites Grünwald and others who have found a cavity clear which was undoubtedly suppurating, though in this case it is possible that the cavity may have but just emptied. The varying thickness of bone in different individuals, the amount of pus and the degree of light all contribute uncertain elements and tend to make the results unreliable except as affording, in the hands of an expert, some additional evidence confirming the more decided symptoms.

Maxillary Antrum. W. E. Casselberry[1] discusses *serous disease of the maxillary antrum* and concludes a historical summary with a careful report of two cases of his own. The diagnosis of a serous accumulation without distention or deformity must be based upon aspiration. The transillumination test is indecisive, although in both cases reported the light transmission was impaired. Impaired light transmission, nasal polypus, degeneration of the middle turbinate, ill-defined browache, or sense of fullness in the cheek should suggest an exploratory puncture. To distinguish a free serous collection from a cyst may be impossible without a wide opening of the sinus. Casselberry believes that the impairment of translucency would vary with the degree of thickening of the mucosa and also, of course, with the intensity of the light.

In discussing *empyema of the antrum in young infants,* Emil Mayer[2] concludes that it is established beyond question that the disease in young children is not merely caries or tuberculosis or an osteomyelitis, but is as distinct an affection as in later life. That so few cases (eight, including two reported by Mayer) are noted in the living is in all probability due to the fact that the mortality is greatest when this complication occurs and also that in

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(1) Laryngoscope, July, 1901.
(2) Laryngoscope, July, 1901.

the very young the presence of localized pain is so difficult to establish. In all the reported cases the symptoms were the same, fistula under the eye usually discharging pus, ectropion, one-sided purulent discharge from the nose with foul odor and eroded bone. Careful observation in cases of nasal diphtheria is urged. Treatment consists of incision, curettement and drainage.

N. H. Pierce[1] urges the more frequent use of the *method of treating antral empyema* by irrigation through the natural openings before resorting to puncture, whether through the inferior or middle meatus, the canine fossa or alveolar process. He prefers the canula of Moritz Schmitt to that of Hartmann, and attaches it to a bulb syringe, which in turn is connected with a gallon percolator jar held or suspended at the level of the patient's head. The solutions preferred are Thiersch's solution, solution of bicarbonate of soda, 2.5 per cent carbolic acid solution, saturated solution of boric acid, and acetotartrate of aluminum (one ounce of the saturated aqueous solution to two quarts of sterilized water).

Frontal Sinus. Wells[2] believes that we are justified in laying down the general proposition that in all cases of *frontal sinus suppuration* where we cannot be certain that polypi, granulations, necrosis or other chronic changes are present, we should, before proceeding to the radical operation, make an attempt to cure by irrigation through the natural openings. The text-book descriptions which refer to the communication between the nasal cavity and frontal sinus are frequently incorrect. In thirty cases examined by Zuckerkandl, he found that in sixteen there was either a bridge of bone in the upper part of the meatus leaving only a blind opening above, or that the middle meatus communicated directly with the frontal sinus. In one-half of Wells' specimens it was possible to enter by a probe carried along the hiatus. In the other half the ostium was immediately or several millimeters

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(1) Laryngoscope, Sept., 1901.
(2) Laryngoscope, April, 1901.

in front of the hiatus. As a rule the uncinate process is our best guide; the canal will be found just behind or just anterior to it. In forty-two cases in dispensary practice the sinus could be entered twenty-eight times. The probe should be bent at three centimeters from the end at an angle of 100 degrees; using the uncinate process as a guide, (resection of the anterior end of the middle turbinate is sometimes necessary), we apply the beak of the probe well backward in the hiatus and draw it forward and upward in the direction of the sinus at the same time that the handle is depressed. If it does not slip easily into the cavity do not use force, but feel for the ostium with the beak a little in front of the hiatus. If the sound be in place (1) the probe will have penetrated about six centimeters or a little more from its extremity to the point where the handle is in contact with the anterior border of the floor of the nose, (2) the direction will be such that it makes an angle of 60 degrees with the floor, (3) the beak will be directed forward (as shown by the ring indicators on the handle), (4) the handle will permit a certain amount of rotation.

E. F. Ingals[1] presents a useful summary of *empyema of the frontal sinus* and reports four typical cases to illustrate better the treatment adopted by him in the various phases of the disease. He performs the radical operation "when there are marked ocular, orbital or cerebral symptoms and in the more violent types of the disease which cause severe pain." His incision is through the center of the shaved eyebrow and he establishes free drainage from the sinus into the nose by means of a Krause antrum trocar. This opening should be large enough to allow the introduction of a large funnel-shaped drainage tube having a flange on its lower end to prevent it from creeping upward into the frontal sinus. He thinks, in opposition to many operators, that a small external opening should be maintained in the majority of cases until suppuration ceases. After-treatment consists of boric acid irrigation and 5 per cent protargol.

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(1) Jour. Am. Med. Assoc., July 27, 1901.

G. Avellis[1] has recently had occasion to treat two cases of *ulceration of the mucous membrane in acute frontal sinusitis.* Both patients were healthy adults with no previous nasal affection, unusual secretion nor headache. In both cases the symptoms commenced suddenly with a violent headache and profuse suppuration of one side of the nose. The headache was restricted to a region over the right eye and the pain was absolutely excruciating at times, most intense in the morning. Both proved to be cases of acute sinusitis in which the bone had become exposed by destruction of the mucous membrane, with subsequent superficial necrosis of the bone and formation of granulations. The extreme intensity of the pains distinguished them from ordinary sinusitis and the usual intranasal treatment proved absolutely ineffectual. Recovery promptly followed trephining with extensive drainage through tubes. The affection was thus arrested before it had passed into a chronic stage, and the necessity was avoided of cauterizing the cavity with the resulting disfiguration of the face. The pains ceased in four and nine days after the operation, and recovery was complete in four and one-half and six weeks. The scar is concealed by the eyebrow which was not shaved off.

Payne[2] believes that the anomalies of the sinus have much to do with the chronicity of the affection. The only positive method of diagnosis is by an exploratory opening on the anterior plate. He believes a modified Kuhnt's operation the best. Instead of removing the whole of the outer plate he makes several openings, exposing every part of the sinus, but at the same time leaving bridges of bone to support the skin. Another modification necessary is to leave two openings for irrigation, one at the external as well as one at the internal angle of the sinus. If the cavity is large, permanent drainage into

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(1) Archiv. f. Laryngol., XI, 3.
(2) Jour. Am. Med. Assoc., July 27, 1901.

the nose is secured and the recesses of the cavity wiped out with a 20 per cent solution of chlorid of zinc. The two external drainage openings are closed in five or six days, the edges of skin being freshened and carefully approximated. The patient must avoid blowing the nose for two weeks after closure of the external wound.

Sphenoid Sinus. F. Furet[1] presents a method of treatment of sphenoid empyema by trepanning both sinuses through the healthy maxillary sinuses. The case was in a woman, aged 25, and a diagnosis was made of double sphenoid empyema without involvement of other accessory cavities. The left middle turbinal, and, eleven days later, the right middle turbinal were removed. The ostium from which the pus escaped could then be seen, and an opening was made sufficiently large to permit lavage and partial curettage. The nasal cavity was, however, still very narrow in spite of these operations and interfered with proper treatment, so that after six months, improvement was but slight. Then the left maxillary sinus was opened under chloroform, after the Caldwell-Luc method. The nasal wall was exsected back to the left sphenoid sinus, into which a large opening was made. Communication was then established between the two sphenoid sinuses, both were packed with iodoform gauze, and the gingivo-labial wound sutured. After six weeks the patient returned to her work with only a little suppuration for which irrigation was done through a catheter. The author considers the procedure indicated in the following conditions: (1) when the maxillary sinus is itself involved, (2) in sphenoid sinusitis complicated with cerebral involvement, where quick and thorough operation is necessary—cases which are not rare, as shown by Toubert in a recent study, (3) in sphenoid sinusitis occurring in an individual with narrow or deformed nasal fossæ.

The same author has contributed[2] another article on chronic sphenoid sinusitis. It is most frequent, he says, in individuals between the ages of 25 and 40. It is most frequently secondary to la grippe, scarlatina, measles, diphtheria and syphilis. Bacteriologic examination has shown the influenza bacillus, pneumococcus, streptococcus, staphylococcus albus, and a large long bacillus, occurring in pairs and staining by Gram's method. Of subjective symptoms, he described various forms of cephalalgia as the most important (hemicrania, frontal or occipital pain, usually well localized, deep, heavy and continuous.) There is dyspepsia, vomiting, diarrhea, and often lassitude and fatigue. Pharyngitis and laryngo-tracheitis are almost constant. Objectively pallor or a chlorotic complexion are noted. Inspection of the anterior nares shows in general muco-pus in the olfactory cleft, redness, swelling and roughness of the mucosa. Posterior rhinoscopy shows the posterior wall of the pharynx to be dry and red, with glistening crusts above and pus bathing the posterior ends of the cornua. By exploration with a bulbous sound through the olfactory cleft necrosis of the anterior wall of the sinus can be made out and the cavity penetrated. Pus may be observed following the course of the sound. With the catheter, pus may be obtained by lavage. Exploratory puncture is not to be recommended on account of the danger of penetrating the superior wall of the sinus in the region of the sella turcica. Resection of the middle turbinate completely uncovers the opening of the sinus and enables one to obtain visual proof of the existence of suppuration if present. This is a simple and safe operation, which can be performed under cocain with the cautery or special cutting forceps. When bilateral sinusitis is present it may be due to the presence of a communicating orifice between the two sinuses, or infection may be carried by the blood or by an ostitis of the intersinusary bony partition. Empyema of the ethmoid cells is frequently associated with sphenoid sinusitis and for the diagnosis of this condition resection of the middle turbinal is essential. Intracranial complications are not rare and would probably be more frequently found if autopsy could be had upon every case of meningitis.

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(1) Presse Médicale, Feb. 6, 1901.
(2) Rev. de Laryng., d'Otol. et de Phinol., May 18, 1901.

Prognosis should always be guarded, and take into consideration the general condition of the patient, which is usually bad, and the possibility of intracranial complications, always fatal. Under the head of treatment the author describes three routes for reaching the sphenoid sinus, and methods of operation: (1) by the natural intranasal route, (2) by the frontal sinus (Jansen and Taptas), and (3) by way of the maxillary sinus (Jansen, Luc, Furet). The author particularly favors the maxillary route as the shortest, roomiest, and affording the operator a constant view of the sphenoid.

A more extensive operation than Furet's is described by Loeve.[1] It is most useful for the extirpation of neoplasms at the base of the skull, in the nose or naso-pharynx. The procedure consists in cutting through the whole length of the septum, beginning anteriorly under the lip, and through the internal and external walls of the maxillary sinus on each side. The floor of the nose may after this be forced down on the tongue. The inferior and middle turbinated bones may be removed if necessary. The growths having been extirpated, the bony floor of the nose and antrum is raised into place.

Rudolph Panse[2] reports a fatal case of *tuberculosis of the maxillary and sphenoid sinuses.* A girl of sixteen, apparently quite healthy, complained (Jan. 24, 1900) of nasal polypi which had been removed several times. The nose was cleared and nitrate of silver 1 to sugar of milk 10 was insufflated to destroy the base. Without having before complained of eye symptoms, the patient was suddenly (Feb. 21) led to the clinic by her mother with the statement that she was totally blind. Presuming that the optic nerve was affected through disease of the frontal, ethmoid or sphenoid sinuses, both frontal sinuses were at once opened. The mucous membrane was very red and peeled from the bone, but there was no pus in the cavities. In order to reach the ethmoid labyrinth the nasal bones were exposed and found to show sharply eroded defects with rather firm granulations. As the disease was not an ordinary empyema and the extended disease of the bone seemed to be specific, the operation was interrupted. Neuroretinitis of both eyes was seen on ophthalmoscopy (March 10). The antisyphilitic treatment had not the least result. Microscopic examination of the granulations was negative. There were slight elevations of temperature in the evening. The patient was troubled only by frequent headaches. The wound would not close, new granulations forming in abundance. At last giant cells were discovered. The author then (May 2) attempted to remove all of the diseased area. The nose was split, the nasal bones taken out, maxillary, frontal and ethmoid sinuses cleared of enormous masses of tuberculous granulations, ethmoid bone, sphenoid bone, anterior wall and septum were removed so that the frontal lobe of the brain was freely exposed. Caseous and granulation masses extended far up between the dura and the skull and were scraped away. The tip of the nose was sewed and tampons introduced from the forehead. The immediate result was freedom from fever for three days, the general condition being fair. Light and shadow could be distinguished. Soon, however, great elevation of temperature set in and finally intolerable headache. The temperature rose gradually to 40° by the beginning of June; strength grew less; in the last days some albumin in the urine, much vomiting, hyperesthesia of the skin; patellar reflexes increased on both sides; abdomen retracted; no stiffness of the neck. The patient died in coma (June 11).

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(1) Monatsch. f. Ohrenheilk., July, 1900.
(2) Fraenkel's Archiv. f. Laryngol., Vol. XI, 3, 478.

Autopsy. Tuberculosis of the ethmoid bone and anterior sphenoid bone; roof of sphenoid sinus intact; roof of orbit carious on both sides and covered with caseous masses; large defect in ethmoid bone and neighborhood; local meningitis; hydrocephalus internus; moderate tuberculosis of lymphatic glands of the neck and bronchi; old focus in apex of right lung; infectious splenic tumor; no tuberculosis of the kidneys, etc.

Tumors of the Accessory Cavities. Richard Schwenn[1] reports ten cases of *malignant tumor of the accessory cavities.* Only careful study of the symptoms will enable one to judge accurately of the extent and seat of such lesions. They will even influence the method of operation. When pressure symptoms, indicating the invasion of the cranial cavity by the tumor, have appeared, a radical operation is generally considered hopeless, especially as it is never known how far the field of operation has been infected from without, and meningitis may immediately follow surgical intervention. Perforation into the interior of the skull may sometimes be diagnosticated even before symptoms of brain pressure appear by a careful consideration of the several symptoms, and a useless and dangerous operation may thus be avoided.

Of the general symptoms common to all malignant nasal growths, stress must be laid on the tendency to degeneration, which very often leads to the formation of pus in the accessory cavities as the result of infection. In seven of the author's cases pus was found. The fetor from the disintegrating tumor, often quite specific, aids in the diagnosis now and then. The irresistible spreading is evidenced by displacing and destroying the bony portions of the nose and the surrounding area. The nose in consequence appears broadened. The tumors are very apt to perforate the ethmoid cells, and as remnants of the growth are very apt to remain behind their anfractuosities, the exceedingly marked tendency to recurrence can be explained. In the more benign growths recurrence sets in comparatively late, even after incomplete operations; in the more malignant ones, recurrence or autopsy shows that remnants were left, or it appeared at the time of operation that complete removal was impossible. Hemorrhages are significant, especially in sarcoma of the nose.

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(1) Fraenkel's Archiv., XI, 3, 351.

Pain occurs in two forms, either as periodical attacks of neuralgia, apparently when the tumor presses on a large nerve trunk; or as continuous and severe pain, which is probably due to pressure on the walls of the cavity, and is especially common in disease of the maxillary sinus. Combinations of the two types may occur. In addition to these general symptoms there are special ones of importance in localizing the tumor.

The ten cases are divided into four groups according to their probable original focus. The first group is formed by tumors in the region of the maxillary antrum. It is of great interest to differentiate them from empyema of the sinus. In both of the author's cases the tumor was accompanied by empyema and perforation to the external surface. Perforation into the cheek or the orbit could have been ascribed to the empyema alone, as is sometimes the case. Multiple perforations are hardly to be found in ordinary empyema, as the causal pressure ceases when the pus has found an exit. For the same reason an empyema does not cause perforation when the pus has been well removed by irrigation. An actively invading tumor, however, can perforate in different places in succession. Multiple perforations may, therefore, be looked upon as an indication of a malignant tumor. Most important in diagnosis is the pain, often intense, which may be considered characteristic if simple retention of pus by closure of the ostium can be excluded. The presence of pus may be misleading. The possibility of the existence of a malignant tumor must not be forgotten even in apparently acute suppuration, when the latter is prolonged, even if pain is not complained of, which happens when the tumor has not yet filled the cavity. A further indication is the failure of irrigations to relieve the feeling of pressure, to diminish the pus, to do away with the odor, or to improve the cachexia present in many of these cases.

The next groups are interesting on account of the ocular symptoms which are occasionally the very first to be noted. The second group is formed by tumors originating in the anterior ethmoid cells. In contradistinction to growths of the posterior ethmoid cells, the naso-pharyngeal cavity remains free. In no case were both sides of the nose obstructed and there was little hindrance to nasal respiration. A second characteristic was involvement of the septum, which occurred in all three cases. In more advanced cases there is ill defined headache. Perhaps this is on account of the tendency of these tumors to crawl toward the base of the skull and to produce the symptoms of brain tumor, after destruction of the bone without definite local symptoms. Psychic disturbances were present once in addition. Perforation into the orbit through the thin partition is to be expected. It is easy to recognize from disturbance of motility, sensibility and vision, when muscles or nerves of the orbit are attacked by the tumor or affected by pressure. A differential diagnosis between the tumor and orbital phlegmon from other causes must be made. This is the more difficult when no tumor can be seen in the nose. At first a tumor of this region might remain hidden behind the turbinal, which would have to be removed to allow a diagnosis to be made. It must surely be rare for orbital phlegmon to cause no functional disturbance of the eye—which was, however, the case in one instance of perforation of the orbit by a malignant tumor. When the eye is displaced it will be to one side, or upward or downward. The lacrimal apparatus will also be implicated. According to the anatomy of the orbital cavity, perforation from the anterior ethmoid cells would result—first in affection of the superior oblique muscle, and the supra- and infra-trochlear nerves, later of the internal rectus muscle.

Perforation into the orbit is still more apt to occur with tumors of the third group, starting from the posterior ethmoid cells. The eyeball protruded in two cases. Impairment of motion of the eyeball to the outside was probably due to affection of the sixth nerve, the complete amaurosis to involvement of the optic nerve. The nasopharyngeal cavity was invaded early, leading to occlusion of both nostrils.

The fourth group, including tumors of the sphenoid sinus, gives at first but few symptoms, which later on are of great variety, caused especially by involvement of the cranial nerves. The time of appearance permits safe conclusions as to the location and progress of the disease, perhaps even before there is evidence in the nose, as occlusion, etc. In the author's case the disease began with pain in the right half of the head, with alleged swelling of the latter, the pain later spreading over the whole head. There was also marked impairment of hearing in the beginning. Not until about nine months later did the eye become affected, there being difficulty in opening, especially the right one. Three weeks later there were found convergent strabismus, paralysis of both recti muscles, diminution of vision, impairment of sensibility in the area of distribution of the second and third branches of the trigeminus, loss of taste on the right half of the tongue, and absence of the sense of smell. As disturbances in the eye were not observed until nine months after the appearance of neuralgia of the third branch of the trigeminus, it must be surmised that the tumor perforated the lateral wall of the sphenoid sinus rather deep down and far back, where it could attack first the third branch of the trigeminus. The temporary freedom of the other nerves near the sinus can also be explained by the greater ease with which they could yield before the pressure of the growth. The marked impairment of vision could be ascribed to pressure on the optic nerve from displacement of the upper wall of the sinus, without the necessity of neuritis or choked papilla. Judging from anatomic specimens, perforations through the middle of the lateral wall of the sphenoid sinus would be followed by compression of the internal carotid and cavernous sinus, possibly with subsequent circulatory disturbance. Then the abducens would be affected running close to the carotid, then the oculo-motor and its near neighbor, the trochlear nerve, and lastly the second branch of the trigeminus because it cannot yield before the pressure just before passing through the foramen rotundum. The third branch of the trigeminus will be the first to be attacked in perforation through the posterior portion of the lateral wall of the sinus—being attacked just before entering the foramen ovale—and, like the second branch, being unable in this position, to yield before the pressure. The oculo-motor nerve lies closer to the posterior portion of the sphenoid sinus than the abducent, but will nevertheless be implicated later because the adjacent portions of the wall of the sinus are thick and not easily perforated. Nerves may be affected not only by pressure but also by inflammatory processes in the neighborhood of the tumor. Such cases will make the diagnosis more difficult as the pronouncedly rapid progress of the disease would point to a pure phlegmon. The sense of smell was affected from implication of the olfactory tract by the tumor's breaking through the upper wall of the sphenoid sinus, or from its filling up the naso-pharyngeal cavity and acting as an obstruction. Impairment of hearing could not be accurately interpreted, the data not being sufficiently noted. The most probable cause is obstruction of the tubal ostium. Reference to the extraordinarily loud subjective noise suggests the possibility that the tumor first perforated the lateral wall of the sphenoid sinus, then extended along the carotid canal, from the wall of which it eroded the capsule of the cochlea. Tumors of the sphenoid sinus may, perhaps, originate in the hypophysis. In such cases the intracranial symptoms would appear very early, especially those from the optic nerve. Cerebro-spinal fluid escapes quite often in the form of nasal hydrorrhea. The author could not report a typical case of tumor of the frontal sinus. There the symptoms would resemble those of tumors of the anterior ethmoid cells when perforating into the orbit and cranial cavity—the levator palpebrarum and superior rectus muscles would perhaps be affected. The symptoms might resemble those of a simple empyema of the frontal sinus. Further observations are much to be desired, as all operations on such malignant tumors are most serious.

G. Prota[1] has reported two cases of *carcinoma of the ethmoid cells,* both fatal. In one, the symptoms were at first attributed to a coexisting naso-pharyngeal polypus and hypertrophic rhinitis. The nasal fossæ were unobstructed and a homogeneous tumefaction on the middle turbinate bone was ascribed to the rhinitis, as also the fronto-occipital neuralgia. The patient was a robust young man, but the carcinoma made rapid progress after extirpation of the polypus and of the tumefied portion of the turbinate bone, which seemed to accelerate its course. In the second case, the symptoms indicated a malignant neoplasm in the ethmoid cells from the first.

Rollet[2] expresses the opinion that *mucocele of the frontal sinus* results from a chronic inflammatory hypersecretion with retention of mucus, causing over-distention of the cavity of the sinus. In 1896 he showed to the Societe de Medicine the case of a youth, aged 18, who had an old-standing hyperostosis obliterating the bridge of the nose, followed by symmetrical orbital tumors which appeared eight months before operation. On trephining, the sinus was found distended with a mucous fluid. In three other cases of mucous distention, hyperostoses have been noticed. In one of them, however, the bony growth was unilateral. Rollet has also found hyperostoses in two cases of old-standing empyema of the frontal sinus on which he has operated. The tumors are often fluctuating in parts, and this fact, together with their exact limitation to the naso-orbital region, should suffice to distinguish them from osteomata and syphilitic exostoses. The cases usually occur at the period of adolescence, but the theories of primary bony overgrowth or primary obstruction of the canal are not as probable explanations of the occurrence as the theory of primary inflammation. In one of the cases mentioned, pressure caused the tumor to empty itself into the nasal fossa.

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(1) Archiv. Ital. di Laringol., XXI, 1.
(2) Lyon Médical, March 31, 1901.

THE NASOPHARYNX.

Dunbar Roy[1] believes chronic *nasopharyngeal bursitis* (Tornwaldt's disease) to be a clinical entity. He condemns the practice of mopping out the nasopharynx without seeing the point for which the application is intended, as being unscientific, and urges more minute study of the nasopharynx with the assistance of the palate retractor if necessary. The treatment recommended consists in cleansing by means of a spray consisting of equal parts of peroxid of hydrogen solution and water by the patient at home, and the application, by the physician, of a solution of nitrate of silver 60 grains to the ounce, directly to the sulcus, followed by thorough spraying of the nasopharynx with hot melted vaselin and orthoform. Prognosis as to ultimate cure is not brilliant.

Mycosis. Donnellan[2] reports a case in a male, 42 years of age and in good health. "The faucial tonsils on each side, part of the postpharyngeal wall and both surfaces of the uvula were covered with a grayish-white membrane somewhat elevated from the mucosa, and closely adherent to it, leaving a bleeding surface when removed by the forceps." Clinically the case resembled nasopharyngeal diphtheria, but there was no albumin in the urine, and no Klebs-Loeffler bacilli. Microscopically the membrane showed mycelial rods or threads of bacillus leptothrix, arranged in parallel rows, surrounded by masses of granular material. The patient was treated by removing portions of the membrane with Grünwald's punch forceps, and the underlying mucosa was mopped with full strength hydrogen dioxid. The membrane gradually disappeared. The disease is comparatively rare, non-contagious, and pursues a prolonged course. It is closely similar in appearance to diphtheria, rendering it necessary that an

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(1) Annals of Otol., etc., August, 1901.
(2) Phila. Med. Jour., Dec. 8, 1900.

accurate diagnosis be made in each individual case, since there is danger that it may be diagnosed as diphtheria, even though there is no constitutional disturbance and no albuminuria, as cases of mild diphtheria not infrequently occur. The treatment consists in the removal of small portions of the growth at repeated sittings by cutting forceps or the galvano-cautery.

Syphilis. This disease has not received sufficient attention in the text-books, according to Fischenbeck,[1] who gives the results of his observation of 235 cases of syphilis observed by him in fifteen years. In these the nose was involved eighty-two times, and of these the nasopharyngeal cavity was diseased forty-nine times. The nasopharynx alone was affected fourteen times—that is, at the examination syphilitic disease could not be demonstrated in any other organ. In the other thirty-five cases, specific disease could be demonstrated elsewhere, too. The second and third stages and hereditary syphilis were seen. Primary sores in the nasopharynx were diagnosticated first in France. They can nearly always be traced with certainty to infection by means of an instrument or of the finger when palpating. The author saw secondary manifestations consisting of mucous patches on the posterior surface of the soft palate and in the vault of the nasopharynx directly above the choanæ. By far the most serious and important manifestations are those of the third stage. The disease appears most frequently during the first six years after infection, the longest interval between infection and localization in the nasopharynx having been twenty-two years, the shortest, two or three months. The picture of the later forms of syphilis in the nasopharynx does not vary greatly. The original focus is always a gummatous infiltration of the mucous membrane, which, however, is rarely observed, as it causes no symptoms and may run a latent course. In most cases ulcerations of various sizes are found. They may extend over the whole vault into the tubes and choanæ, and downward over the

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(1) Fränkel's Archiv., XI, 3.

pharyngeal mucous membrane. The whole space is thus converted into a cavity filled with dirty grayish, blood-stained masses of pus.

The vault of the pharynx at the location of the pharyngeal bursa is a favorite site of the isolated ulcer. On probing, exposed bone can be felt, especially at the roof. Sequestration is more rare, however, than in the nose. Patients complain of pain in the throat of long duration. The pain in swallowing seems to be much greater than in ulcers of the pharynx or larynx. Headache is pathognomonic. The pain is described as very severe, of a boring and sticking character, and as present in the occipital region. At the same time the patients complain of pressure in the whole head, and of a feeling of numbness or obtuseness. Earache is usually transmitted. In one of the author's cases an ulcer had spread from the vault into the left tube, and produced an acute otitis media. The enormous secretion is in a certain sense pathognomonic. The author was induced by it to open into the accessory sinuses of the nose, but usually without benefit. The secretion ceases gradually as the ulcers are cleansed and cured. It is apt to affect the stomach disastrously. The cachectic appearance of such patients is most striking, but they recuperate very rapidly when treated energetically. Fetor is sometimes present, especially when the nose is involved. The use of the post-rhinoscopic mirror cannot be urged enough, as ulcerations may persist in the nasopharynx when all other lesions have yielded to antisyphilitic treatment. Stress must be laid on the necessity of combining general syphilitic with energetic and rational topical treatment. In extensive ulceration, general treatment alone cannot effect a complete cure without simultaneous topical applications. Large ulcerations were seen immediately after the use of from twenty to forty inunctions, and of large doses of potassic iodid. The ulcers showed a tendency to spread rather than to heal. The abundant secretion leads to the formation of crusts, which keep up the morbid process. The author insists on frequent and thorough cleansing, best by means of a naso-pharyngeal syringe with small openings, introduced through the mouth. The middle ear never became infected as a result of the sometimes forcible irrigation with the many remedies used. Especially when great pain is present, insufflations of equal parts of calomel and orthoform as well as applications of iodid-potassic iodid-glycerin solutions were the most serviceable. Strong caustics, as well as the sharp spoon, have been abandoned, although when granulation tissue keeps up the formation of secretion it must be removed. In about a dozen cases of syphilis which had run its course, where the whole interior of the nose was destroyed and the mucous membrane full of cicatricial tissue, the author found that topical treatment had either been neglected altogether or had been insufficient. On the other hand, even in his very worst cases, there were never any perforations of any extent, nor any adhesions as long as he had opportunity to observe them. The brief but often interesting and instructive histories of forty-nine cases are appended.

Pharyngeal Tonsil. F. Wex(1) gives a detailed account of the *normal histology* of the pharyngeal tonsil in the young infant. In all but one instance the tonsils were covered with ciliated columnar epithelium. Slightly horny epithelium covered the tonsillar surface in the single instance, but without extension into the lacunæ, or into the mouths of the ducts. The author then relates his cases of tuberculosis of the pharyngeal tonsil in which he found tubercle bacilli in six out of the seven cases reported. In reviewing the literature, the author finds that in 599 examined, there were thirty-three cases of tuberculosis, making 5.51 per cent.

M. D. Lederman(2) states that *mouth-breathing in childhood* exerts a harmful influence on the growing osseous structures of the oral cavity and surrounding parts. This influence is manifested by displacement of the teeth in the alveolar arch. The cases are thus frequently brought to the dentist, who should always advise removal of the nasal or postnasal obstruction as well as devising mechanical means for correcting the deformity. The untoward results are produced by the faultily directed atmospheric and muscular pressure. When the mouth is closed the tongue rests against the teeth, the alveolar processes and the palate, thus equalizing the pressure of the teeth against the lateral portions of the maxilla. This provision of nature loses its influence when the mouth is kept open. Thumb-sucking is also suggested as an exciting cause of the dome-shaped palate. If the milk teeth are retained beyond the normal time of shedding the result is often displacement of the permanent set, and indeed this is the most common cause of such displacement. The delay in shedding the milk teeth is caused by some defect in the general system which interferes with absorption. Here again nasal obstruction may act in determining the perverted constitutional condition. To avoid such malformations, prophylactic measures must be employed at an early period, and the etiologic factor removed at an early period of childhood.

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(1) Archives of Otology, XXIX, 6.
(2) N. Y. Med. Jour.

Prophylactic treatment against adenoids for all children who show a tendency to lymphatic enlargements is recommended by Cuvillier.[1] The treatment consists of local antisepsis and general tonics. He advises mentholated oil 1:50 or sterilized olive oil with resorcin 1:25, to be instilled two or three times daily. The insufflation of powders such as boric acid and talcum āā. 5.0 with menthol 0.10, and nasal irrigation with boric acid solution, not more than 20 cc. at a time, are also recommended. Of 2,019 cases of adenoid growths treated at La Clinique des Enfants Malades, 1,214 were of the respiratory type, 75 of the auricular type and 703 of mixed form.

P. D. Kerrison[2] calls attention to the prevalence of pharyngeal adenoids, *often unrecognized in children,* and

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(1) Ann. de Med. et Chirurg. Infant., Jan. 1, 1901.
(2) Medical News, Feb. 3, 1901.

their responsibility for grave conditions in adolescence and in adult life, impairing the hearing, adding greatly to the gravity of intercurrent affections and increasing the patient's receptivity to the germs of tuberculosis and diphtheria. He recommends the routine examination of all children for adenoids, and, of course, their prompt and complete removal when present. This is best accomplished while the patient is under the influence of a general anesthetic.

Aural disease is rated as the most important sequela of pharyngeal adenoids by J. H. Woodward,[1] while laying emphasis as well upon the well-known deleterious influence of adenoids upon the general health by producing anemia, malnutrition, mental apathy, listlessness and stunted growth. These effects, he thinks, are due not only to the mechanical obstruction of the upper air passages, but to the possible secretion of a toxic substance by the adenoid growth itself. He cites the changes for the better which follow the removal of adenoids as among the most striking that are observed in medical practice.

When the removal of adenoids *fails to effect the promised cure* of mouth breathing, the cause, according to Huber,[2] is to be sought among the many conditions which may cause obstruction to the free passage of air through the nose. The trouble will certainly be located in this region. Adenoids can be curetted without narcosis by the Delstanche modification of Gottstein's curette. After the operation, warm salt solution is instilled into the nose every few hours, and subsequently two or three times daily for at least a month. Massage of the facial muscles restores their tone.

O. T. Freer[3] maintains that no treatment is effective except thorough operation. He combats the idea that the nasopharynx is not especially sensitive, and vigorously opposes operation without anesthesia on account of the intense fright and pain to the child, and the impossibility

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(1) Medical News, Feb. 23.
(2) Pediatrics, March 1, 1901.
(3) Jour. Am. Med. Assoc., Nov. 24, 1900.

of doing a thorough or satisfactory operation without the relaxation which accompanies anesthesia. Even in those cases of older children in which cocain anesthesia can be used, the operation is apt to be incomplete, haphazard and imperfect. The question of anesthesia is discussed at length and the author concludes that the Schleich mixture is not to be recommended; that nitrous oxid does not maintain a sufficiently long anesthesia; that chloroform is unsafe, numerous deaths and many frights being reported from its use; and though ether has its objections, it is to be preferred to any of the others, in his opinion.

In operating he prefers a position in which his patient lies on the side with his chest close to the edge of the table. He describes various instruments, but prefers Loewenberg's forceps, using two sizes in each case, and after these he uses the Ingals nasal bone-forceps to remove any masses that may remain on the posterior wall. He thinks the Gottstein knife frequently fails to remove the whole of the growth, leaving deposits on the posterior and lateral pharyngeal walls, that with it there is some liability of wounding the Eustachian prominences, and that it is too large an instrument to adapt itself to the nooks and recesses of the walls of the nasopharynx. "No operation for adenoid vegetation is complete without this last stage [use of nasal bone-forceps] of the performanee. Though the finger pressed into the choanæ may at first discover no growths whatever, as soon as the bone forceps are pushed through the nostrils against it, these polypoid masses are readily felt." The finger is used to be sure that the tissue is all removed. No after-treatment is necessary.

Wyatt Wingrave[1] describes a "tonsillotomy rash" which occurs occasionally after the removal of tonsils and adenoids. The eruption appears on the second or third day, either papular, roseolous or erythematous in type. It most frequently attacks the neck, chest and abdomen, lasts generally two or three days, disappears without desquamation,

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(1) Jour. of Laryngol., October, 1901.

but is sometimes associated with intense itching. The constitutional disturbance is slight.

H. Gradle[1] has discarded his well-known forceps and performs all adenoid operations with his modified Schuetz adenotome. The chief difference is in the form of the handle. On the basis of his experience he "can say emphatically that the adenotome will in every instance remove the entire tonsil in one sweep with less pain, and, on the average, less hemorrhage than any other instrument. It is only when a timid operator does not press sufficiently that any adenoid tissue is left. Any one who has seen the adenotome satisfactorily used cannot but decide that in the average case the discomforts and the psychic shock of anesthesia far outweigh those of the operation," and in view of the danger he has no hesitation in condemning anesthesia as unjustifiable, except in the case of children who cannot be managed by gentleness, or when the faucial tonsils require operation at the same time.

MOUTH, PHARYNX AND TONSILS

J. L. Goodale[2] presents a contribution to the pathology of the so-called *neurotic inflammations of the mouth,* which will be of value to the laryngologist, whose knowledge of diseases of the skin is unfortunately too often superficial. The phenomena are grouped under the following divisions: 1. Herpes zoster. 2. Herpes buccalis and lingualis, herpes facialis, erythema exudativum multiforme or bullosum. 3. Erythema nodosum, purpura rheumatica. 4. Stomatitis neurotica chronica of Jacobi. 5. Dermatitis herpetiformis of Duhring. 6. Pemphigus. The value of the essay is increased by a bibliographical list of thirty-three papers.

Writing on the pathology of *pharyngomycosis,* D. B. Kyle[3] supports the views of Seibenmann, Brown-Kelly,

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(1) Laryngoscope, March, 1901.
(2) Annals of Otol., etc., May, 1901.
(3) Laryngoscope, April, 1901.

Goodale and others as to the etiology, they believing that the affection is not due to the leptothrix, but is in reality a keratosis associated with a varying degree of subepithelial change. Kyle believes that the action of the leptothrix is secondary and that it is more than likely that the chemical change brought about by the pathologic alteration in the sub-mucosa causes a change in the glandular secretion and forms a soil which is a suitable nidus for the proliferation of certain bacteria. The sections of tissue which illustrate the paper show the primary lesion to be in the sub-mucosa, and not superficial, as would probably be the case if bacteria caused the condition. The value of the paper is enhanced by a complete bibliographic list of 111 references.

Teeth. The relatively new dental specialty, orthodontia, brings the dentist and the laryngologist into closer relation, for while the correction of malocclusion depends largely upon the mechanical treatment of the teeth, among the most common causes are the conditions which belong to the realm of laryngology. H. W. Loeb[1] suggests an operation for the *approximation of the central incisors,* which has been effective in the cases in which it was employed. It consists in plunging a galvano-cautery knife in the median line, beginning at the upper and anterior margin of the mass of tissue which separates the teeth, and carrying it well under and behind the alveolus even to the fan-shaped prolongation of the tissue on the palate. One to four applications are required and care must be taken not to insert the cautery point too close to the teeth. Retention bands may be used at the same time.

The Palate. Two years ago, Maljutin, of Moscow, published an article on the influence of the formation of the hard palate on the quality of the voice in singers. Further observations have confirmed these views. This is the case not only in singers, but also in others who are required to speak much or to read aloud, great irritability of the throat and tendency to tire being ascribed to insuffi-

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(1) Annals of Otology, etc., August, 1901.

cient arching of the hard palate. He reports[1] the following case in a student, aged 28 years, who consulted the author on account of his abnormal voice, which had troubled him since his fifteenth year. At that time his clear child's voice began to change, but retained the character of a high non-metallic falsetto until his seventeenth year. Electricity was applied and he was advised to speak in as deep a voice as possible. He succeeded in learning to do so, but only for a short period. When excited or attempting to speak with a loud voice he became tired and his voice broke. In phonation the cords were completely approximated when the low notes were produced, and when higher notes were formed the posterior part of the left cord lags, leaving a small gap. The structure of the upper jaw is striking. It is too narrow, while of the normal length (5 cm.) and of very great height (2.2 cm.). The author never saw so narrow a jaw, even in a woman. The distance between the back molars measures 2 cm., so that the hard palate has the shape of a narrow, deep sack. The explanation is advanced that the patient was born with a deformed upper jaw, and that the resonator was better adapted to a high feminine than to a deep masculine voice. As long as the vocal cords were undeveloped, the boy's voice was normally childlike. When, however, they grew larger at puberty, and could not vibrate the necessary number of times for the formation of high notes, the young man could not develop a man's deeper voice because the construction of the resonator made the transition exceedingly difficult. He could not retain his high voice because the long cords could not in their whole length vibrate quickly enough. So only a part of the cords was set in motion, and the falsetto thus produced.

As the patient was quite unmusical, exercises with the tuning fork and the piano had to be abandoned. A plate was made for him which made the form of the palate somewhat concave, resembling the form of a resonator for

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(1) Fränkel's Archiv., XI, 3474.

a baritone. After a few months of indiscriminate use of the voice while wearing this plate, the patient's voice improved greatly. It became easy for him to use the middle register, and falsetto notes became rare. He is now able to dispense with the plate altogether. His voice is non-metallic and hollow, but not hoarse. Persons whose palates do not correspond with their voices must develop the faculty of changing, by means of the muscles of the soft palate and the larynx, the form of the resonator, and thus securing better resonance of the voice. The plate enabled the patient to obtain this faculty of accommodation.

Tubercular Perforation of the Palate. According to Grocler,[1] tubercular perforation of the veil of the palate may be primary, and of the character of a purely local lesion; usually, however (six times out of eight), it follows a pulmonary or laryngeal tuberculosis. It always accompanies tubercular ulcerations of the lips, gums, palate, tongue, tonsils and pharynx. The ulcerations present irregular polycyclic borders with yellowish granulations. They prefer the middle part of the velum. They may be confounded with syphilitic ulceration, but the latter affects particularly the osseous walls and its borders are more sharp. The remainder of the mucosa is red and does not show the ulcerations and paleness of tuberculosis. Single in tuberculosis, the perforation is often multiple in syphilis. The perforating buccal disease coexists with other manifestations of tuberculosis. The treatment is first of all general. Locally we may use lactic acid, one to ten, Ziehl's solution, chromic acid, tincture of iodin and cauterization.

Uvula. A. Fried[2] reports a peculiar case in a man of 49 who had been suffering for four days with constant nausea and vomiting, which had prevented him from taking even liquid nourishment. The symptoms dated from his having eaten on one occasion plums direct from the

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(1) Bulletin de Laryngol., etc., March 30, 1901.
(2) Ungar. Mediz. Presse, March 1, 1901.

tree, immediately after which pain in the throat was experienced. Examination of the pharynx showed the uvula to be much enlarged, and presenting on its lower portion a dark brown mass, about half a centimeter in length, which had the appearance of a foreign body. Examination showed this to be imbedded only at one end. On removal with forceps it was found to be an ant, which had bored deeply into the uvula. Twenty-four hours later the patient had completely recovered.

THE TONSILS.

A *new method of operation on hypertrophied tonsils* is described by Vacher[1] of Orleans. He employs a special forceps, made of two sharp spoons of different curves. All adhesions about the tonsil having been first separated, with the aid of curved scissors, the gland is grasped with the forceps and removed with a rotary motion. The operation is said to be comparatively bloodless, and is especially adapted to young children and cases where the tonsils are buried beneath the pillars.

Uhlman[2] gives a very full résumé of the literature on the subject of *the tonsils as portals of infection.* He presents the following conclusions: 1. That the normal tonsil has a physiologic function, probably protective to the organism. 2. That being in itself often diseased, the physiologic function of the tonsil is impaired, and that instead of being protective, it is the nidus for the growth and distribution of pathogenic organisms and their poisonous products in the system. 3. That many grave and fatal general infections have their origin in the tonsils. 4. That if the exanthemata, particularly scarlatina, are of bacterial origin, the tonsil acts in part as port of entry. 5. That acute articular rheumatism, and the diseases often associated with it, endocarditis and chorea, in the

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(1) Semaine medicale, May 8, 1901.
(2) Medical News, Jan. 26, 1901.

great majority of cases, are due to the action of attenuated bacteria, their toxins, or both, entering the system through a diseased tonsil. 6. That in those rare cases of typhoid fever in which no intestinal lesions can be demonstrated, the similarity of the tonsillar tissue and Payer's patches suggests the tonsil as the portal of entry of the Eberth bacillus. 7. That scrofulosis is often associated with diseased tonsillar tissue, and that the tubercle bacillus often enters the system *via* the tonsils. 8. That the tonsil is too little examined at autopsy, and much light might be shed on fevers of uncertain origin by its bacteriologic and histologic examination. The bibliography includes sixty-eight references to the literature.

Tonsillitis.—Etiology. Duval[1] maintains that *tonsillites are essentially infectious.* They appear with diversified clinical aspects. Usually they are very benign, but they may cause fatal complications. Sometimes the constitutional symptoms are so pronounced that they mask the local state completely. We can cite among the complications: phlegmon of the neck, gangrene, pleurisy, pneumonia, swelling of the liver and spleen, ovaritis, orchitis, nephritis, erythema and the arthropathies. It is necessary, as Landouzy says, to try to remove the clinical doubts by bacteriology, which will often show the truth when confusion, doubt and hesitation lead into error. Recent investigations, however, seem to show that there is no specific microörganism of tonsillitis. Tonsillitis should be regarded as one of the varieties of localization of any virulent infection, as streptococcic, staphylococcic, etc. According to the degree of the intoxication, the tonsil alone reacts, or other morbid manifestations appear. Since it has been well established that the tonsillites are of an infectious nature, we may deduce that they are contagious. This the author endeavors to establish by a series of observations. The ordinary methods employed in the bacteriologic examination of anginas are not sufficiently precise to determine with exactness the rôle played by

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(1) Bull. de Laryngol., etc., March 30, 1901.

such organisms as the *streptococcus and the pneumococcus.* A serum reaction, however, on the part of the organism in the presence of a given germ demonstrates the part which this germ has taken in the production of the disease. Dezancon and Grippon[1] have studied twelve cases of acutenon-diphtheritic angina with regard to their pneumococcus serum reaction. This was positive in all cases, and presented a nearly uniform type of moderate intensity and soon disappeared. These results are in accordance with earlier bacteriologic examinations which demonstrated the existence of pneumococcus angina, and also the activity of the pneumococcus in the anginas formerly termed streptococcus angina. A revision of the so-called streptococcus anginas seems consequently necessary.

In an article on rheumatic fever in relation to the throat, St. Clair Thompson[2] states that there is a general acceptation of the view that an association exists between rheumatism and tonsillitis. This is expressed from two points of view: one that the rheumatic poison enters the system through the tonsil, the local inflammation of which is the first local expression of the disease; the other, that tonsillitis is, in certain cases, one of the manifestations of the rheumatic diathesis. These views are supported by numerous observations. Many of the clinical records are too fragmentary to advance the subject, and it seems that the various theories that have been propounded are somewhat premature, and that it is much safer to await further pathologic investigations to show which of our clinical deductions are trustworthy.

Further knowledge is required as to the nature of rheumatism itself, and also as to the various causes and forms of tonsillitis associated with it. So far, peritonsillar abscess, or quinsy, is the one form of sore throat which is not accepted as commonly of a rheumatic origin. It is not mentioned by Fowler or Mantle, and Hingston Fox excludes it as a rheumatic disease. Trousseau does not

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(1) Hebdom. de Med. et de Chir., 1900, No. 85.
(2) Laryngoscope, Jan., 1901.

particularly refer to tonsillitis as a forerunner of rheumatic fever, but to an evanescent form of sore throat. Evidently the subject will bear closer investigation.

The present state of our knowledge concerning the relation of tonsillar affections to rheumatism might be summarized as follows: 1. It is undoubted that a certain number of cases of acute rheumatism are preceded by angina, the proportion varying from 30 to 80 per cent. 2. Both rheumatism and angina have many etiologic points in common—season of the year, cold, wet, fatigue, depression, vitiated air, etc. 3. The connection of angina and rheumatism, though undoubted in a number of cases, is not yet clearly explained. 4. The tonsil may be the port of entry of the rheumatic virus, and this even though the naked-eye appearance of the throat gives no indication of its being affected. 5. The particular affection of the throat which is associated with rheumatism is not yet established. Apparently it is not peritonsillar abscess (quinsy). 6. Peritonsillar inflammation does not appear to be arrested by the administration of antirheumatic remedies. Many cases of parenchymatous and lacunar tonsillitis, on the other hand, are considerably benefited by the administration of salicine or salicylate of soda. That this action proves the rheumatic nature of the disease cannot yet be accepted. 7. The question requires further research in two directions: one is the differentiation of the various forms of angina, and ascertaining which one is associated with rheumatism; the other in further research to discover the true nature of rheumatism.

P. Hellat[1] found indications of a *streptothrix in the concretions* discovered in the tonsils in eighty cases of tonsillitis. He was unable to cultivate the fungus, but considers himself justified in calling attention to this peculiar variety of tonsillitis, characterized by pain during swallowing and on pressure of the region of the tonsils—which are red and swollen with occasional pain radiating into the ears, and vocal disturbances, especially in singers.

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(1) St. Petersb. med. Woch., 1900, 44.

The small plugs are found most frequently in the upper recesses and they irritate the tissues both mechanically and by the chemical products of the fungus. Putrefaction is indicated by the pungent putrid odor of the plugs. They are regenerated in one or two weeks, and the fungus causing them cannot be exterminated by medicinal means, as it lurks in the deepest recesses. The only rational treatment is the evacuation of the follicles and recesses, with ablation of the tonsils and galvano-cauterization if necessary. Concretions found in the tonsils are therefore not always the product of the secretions of the tonsils, but are the result of microbic activity and the cause of the existing inflammation in certain cases.

Angina of Vincent. Professor Vincent of Val de Grace was the first (1898) to report a special and rare form of angina, describing a clinical and anatomo-pathologic evolution almost pathognomonic. He gave at the same time a complete description of the bacillus fusiformis and the spirillum, attributing to them from the first a specific pathogenic rôle, in spite of the absence of control experiments. Hospital putrefaction has the same specific agent as angina ulcero-membranosa.

A. Athanasui[1] sets forth the reasons which caused him to accept the conclusions of Vincent, reporting a certain number of observations on Vincent's angina with bacteriologic control. He insists on the difficulty of diagnosis from diphtheria, as only bacteriologic examination of the crypts and shreds will prevent a mistake which might be disastrous. In the stage of excavation the bacteriologic examination will permit the elimination of primary and tertiary syphilitic lesions. The termination is favorable in all cases. The very simple treatment consists of nasal and oral lavage with a weak solution of potassium permanganate.

Letulle[2] describes two cases of the disease. It is an acute angina, tonsillar, febrile or afebrile at the begin-

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(1) Bull. de Laryngol., etc., March 30, 1901.
(2) Presse méd., Dec. 29, 1900.

ning, with slight pain and moderate disturbance of function. The affection is characterized by an ulcerative, membraniform, pulpy or ulcero-membranous inflammation of one tonsil, rarely both, and of the adjacent mucous membrane. The involvement of the submaxillary glands is slight, and the general state is little affected in spite of the fetid breath and gastric disturbance which accompany the commencement. In the fresh debris and in the saliva, there are seen under the microscope, together with other bacteria, two special elements. One is a long delicate spiral, floating in the fluid, and after remaining immobile for some time, moves quickly, extending and retracting like a spring, but the amount of movement is not great. These are the spirochaetae. The other is a sort of bacterium, long, swollen at the middle and moving more vigorously than the spirochaetae. These are the spirilla and are always present in the disease. They have an undulating motion like a fish. The spirochaetae are not always found. They can be dried and stained with Ziehl's fluid. Efforts at cultivation were unsuccessful for either form.

According to Louis Lesner,[1] Vincent's angina is clinically and bacteriologically *analogous to ulcero-membranous stomatitis.* It is perhaps only a localization of this disease on the tonsils. The reasons given for his opinions are: 1. In both cases the disease chooses its object in the same class of individuals *i. e.,* people weakened by fatigue, defective or insufficient alimentation, an anterior affection, or presenting local irritative causes—bad teeth or oral uncleanliness. 2. The beginning, equally insidious, is manifested by local troubles, pain on mastication and deglutition with or without slight fever. 3. In both cases the lesions consist of an ulceration with a rough floor and borders surrounded by an inflammatory zone. This ulcer is covered by a false membrane of greater or less adherency and consistency, of a grayish color. The breath is fetid. 4. The affected part is frequently uni-

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(1) Bull. de Laryngol., etc.

lateral in angina as in stomatitis. 5. The benign and short course of both diseases when treated. 6. Glandular swelling of the affected side. 7. The necrobiotic process, which commences in both cases with the destruction of a part of the mucosa with the formation of a pseudomembranous exudate. 8. Finally, the author adds to all these reasons the simultaneous presence of buccal and tonsillar lesions, and their simultaneous evolution, in the new observations reported in his thesis.

Furthermore, the collection of the observed facts gives cause to believe that the fusiform bacillus of Vincent and Bernheim is the pathogenic agent of this double affection. Association with spirilla seems to facilitate the development of the fusiform bacillus. This bacillus normally exists in the mouth, but in small numbers. It becomes more abundant under the influence of certain inflammations. In mercurial stomatitis its importance becomes considerable, especially since it produces ulcerations, which are covered by a whitish membrane. Then, with the spirillum, it comprises almost the entire flora, which makes the author think, in agreement with Galippe and the Germans, that this disease is perhaps only a variety of stomatitis ulcero-membranosa. In case of difficulty in diagnosis of the ulcero-membranous lesions of the mouth and tonsils, a direct examination of a piece of false membrane and a culture will take away all doubt.

Complications. Dehio[1] and Thomson[2] have observed three cases of a *septic, maculo-papulous erythema,* bilateral and symmetrical, appearing in the course of a follicular angina. Thomson's two cases occurred in an epidemic of la grippe affecting nine out of nineteen persons in one house. In three a follicular angina developed, accompanied by otitis in one case and by the erythema in the two others, one of whom died after exhibiting for a few hours rigidity of the muscles of the neck so that he could scarcely open his mouth.

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(1) St. Petersb. med. Woch., Aug. 20, 1899.
(2) St. Petersb. med. Woch., Sept. 14, 1901.

That *paralysis of the soft palate* after a pseudomembranous angina is not positive evidence of the presence of the Klebs-Loeffler bacillus, is the conclusion, contrary to the text-books, which is forced by the case reported by Moses Kreschner.[1] Despite a bacteriologic technic, which, according to the author, was almost perfect, no Klebs-Loeffler bacilli were demonstrable in successive cultures. The author ascribes the paralysis either to a pressure from direct action of the inflammatory process (the palatine nerves being contiguous to the inflammation), or to a neuritis from the toxins generated by the streptococci. He cites two other cases in the literature, one by Baginsky and the other by Bourges, in which paralysis followed though the Klebs-Loeffler bacillus was absent.

After a very complete comparison of history, etiology and symptoms, which shows the almost complete clinical analogy between tonsillar orchitis and the well-known *simple orchitis,* Tesseyre[2] arrives at the following conclusions, based on a personal fact and six other observations, chiefly of Verneuil or Joal: Orchitis may be observed during the course of acute tonsillitis or during its period of decline; it is generally benign, usually terminating by resolution; relapse rarely occurs, as opposed to tonsillitis, where relapse is frequent.

Peritonsillar Abscess. Grünwald[3] states that what is usually called a peritonsillar or tonsillar abscess is in reality a *supratonsillar phlegmon.* The inflammation occurs in the angle between the two upper ends of the palatal arch. The infectious germs find a safe shelter in the recess above the tonsils, and easily penetrate into the loose tissues. If the abscess is incised at the most accessible point, the conditions for its recurrence remain as propitious as before, but if the recess is slit, the possibility of renewed infection is materially diminished. The abscess should therefore be opened through the supratonsillar

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(1) Medical Record, June 1, 1901.
(2) Bull. de Laryngol., etc., March 30, 1901.
(3) Münch. med. Woch., July 23, 1901.

fossa, which is easily accomplished. The symptoms of an abscess of this kind are the difficulty in opening the jaws, from the inflammation extending into the adjacent pterygoid muscles, the swelling and redness of one side of the soft palate, with occasionally edema of the upper half of the pillars of the fauces and uvula, with very slight, if any, swelling of the tonsil.

The *genuine peritonsillar abscess* is far less frequent and presents an entirely different picture. The inflammation is restricted to the connective tissue surrounding and in front of the tonsil, and is distinguished by swelling and possibly edema of the anterior pillars, and is usually referable to a foreign body or a tooth. The wisdom tooth may cause inflammation of this kind, but not necessarily leading to abscess formation. The opening of the mouth is somewhat painful, but it can be opened nearly to the normal extent, which is impossible in the case of the first described abscess. The route of the pus from the infecting tooth to the abscess is frequently marked by a line of edema. Deep incision through the rear wall of the last alveolus will usually disclose a deep cavity and an incision across the edematous line will bring the pus. In two cases in which no pus could be revealed by incision, the author diagnosed the case as an erysipelatous inflammation of the throat, which was confirmed by the course of the affection.

An abscess in the tonsil is characterized by the swelling of one tonsil and the absence of the difficulty in opening the jaws. These abscesses in the tonsils are liable to recur unless incised at the lowest point. Grünwald has observed one case of chronic abscess of the tonsil rebellious to all measures. An acute retronasal phlegmon may cause fever and prostration and difficulty in swallowing, but the throat shows little, if any, sign of inflammation. It may be erroneously diagnosed as a rheumatic sore throat, although the obstruction of the nose will in time correct the mistake. The hidden phlegmon may cause severe general symptoms, simulating typhoid, and a fatal termination may result in such cases if the heart was previously affected or is suffering from the severity of the infection. Even slight stenosis of the air passages entails extra work on the heart, and it is liable to yield under such circumstances. Death from suffocation may result, even though the stenosis is by no means pronounced enough to cause mechanical suffocation. He describes a case in which intervention at the right moment and relief of the slight stenosis enabled the heart to accomplish its task and the patient recovered. The weakness of the heart action persisted even after the pus had been evacuated and the stenosis relieved. The pulse did not subside until the following day. The threatening cyanosis in this case had been due to the inspiration of the root of the tongue while the patient was in a semiconscious condition. All of these abscesses in the vicinity of the tonsils are compressed into a comparatively small space, near the main blood vessels and nerves of the neck, especially the vagus, and the conditions are peculiarly favorable for the absorption of toxins, which is a sufficient explanation for the severity of the symptoms observed.

W. F. Chappell[1] reports a case of hemorrhage from a circumtonsillar abscess. The abscess pointed in the middle of the posterior pillar of the soft palate, where it was incised. Four days later the patient complained of a sudden severe pain in the throat, followed in a few minutes by a hemorrhage of about six ounces, which ceased on the application of tannic acid. Four hours later a second hemorrhage occurred of about eight ounces, which was also stopped by an astringent gargle. Five days later a third hemorrhage occurred, when eight ounces of blood were lost. A large incision was made through the anterior surface of the soft palate and carried backward until the abscess cavity was reached. After thorough washing out of the blood clots with hydrogen peroxid, the ascending pharyngeal artery was seen, but no ulcerations could be discovered in its walls. The cavity was packed with iodoform gauze. This packing was changed daily for ten

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(1) N. Y. Med. Jour., March 2, 1901.

days, when the wound had healed, and no further hemorrhage occurred. Ten similar cases which have been reported in the literature are referred to. Of these only two recovered. There seems no reason for the great mortality which these reports show. Immediate ligation of the carotid on the occurrence of the first hemorrhage should be practiced, or, as proved successful in the case reported, a free incision through the anterior wall of the soft palate, and firm packing of the abscess cavity with antiseptic gauze.

Tuberculosis. Baup,[1] after having reviewed the structure of simple tonsillar hypertrophy, shows that tuberculous *larvée* of one or more tonsils exists as a primary manifestation of tuberculosis. It is a rare affection, manifesting itself in the tonsils in different ways, sometimes by typical tubercles, sometimes by diffuse infiltration. The inoculation of guinea pigs by pieces of tonsils confirms the histologic result. Direct tuberculization of the tonsils of animals is possible, but a delicate proceeding. By placing colonies of Koch's bacilli on the tonsils of rabbits, the author was able to produce profound lesions of the tonsillar tissues, but he never found bacilli or tubercles, although the peritonsillar and cervical glands were caseous. From this it would appear that the tonsil had been the port of entry.

The symptomatology of tonsillar tuberculosis is very vague, and the diagnosis can only be suspected from an observation of the general state and the relations which connect tonsillar tuberculosis with that of the glands of the neck, middle ear, and intestine.

Syphilis. Thirty-five cases of chancre of the tonsil are reported by J. E. Rhodes,[2] three cases occurring in his own practice and thirty-two hitherto unreported. In Muenchheimer's list of 10,265 extragenital chancres, 504 tonsillar chancres were found. Two varieties of the initial lesion are mentioned. In one the affection is so slight that

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(1) Bull. de Laryng., etc., March 30, 1901.
(2) Laryngoscope, July, 1901.

it may be overlooked until secondary symptoms appear; in the other the pathologic process is marked by decided pain in swallowing or speaking, radiating to the ear. The whole tonsil is swollen, congested and surrounded by a zone of hyperemia. It is not so much inflamed as hard and infiltrated. The ulcer is superficial with a layer of necrotic, yellowish debris on its floor. Malaise and fever may be present. The chancre usually disappears in four to six weeks. In six cases kissing was the cause of inoculation, in four bestial practices, in twelve the cause is unknown, in three introduction of the tongue into the mouth. Mediate conveyance of the disease occurred six times by means of pipes, cigar-cutting machine, drinking vessels, in one case by means of dental instruments and in another by a bistoury used to open a tonsillar abscess.

Tumors. G. Prota[1] reports twelve cases of *malignant tumors* in the tonsils. The average age of the patients was between 40 and 60, but one case is on record in which the patient was 6 and in another 18 years old. He states that any unilateral affection of the tonsil should suggest the possibility of a neoplasm, especially in an adult. The rapid enlargement of the submaxillary glands, the ulcerative course and the invasion of the other tonsil reveal its malignant character. Active intervention is advisable only in case of a circumscribed tumor with no involvement of the glands. In such a case the tumor may be removed through the mouth. Otherwise, external operation is the only means of extirpating all the affected tissues. Only two of his patients were operated on and recurrence followed in one of these. The rest were unmistakably inoperable when first seen.

Von Heinleth[2] reports a patient in good health two years after the removal of a large *sarcoma* from the right wall of the pharynx. It evidently originated in the tonsil. The patient was a man of 59, and the first symptom had been the swelling of the glands of the right side of the

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(1) Arch. Ital. di Laringologia, XXI, 1.
(2) Münch. med. Woch., Sept. 3, 1901.

neck. After three months a difficulty in swallowing was experienced, and the swollen tonsil attracted attention. The tumor continued to increase in spite of chemical cauterizing, and the patient became emaciated. Nine months after the first symptoms the tumor in the tonsil and the external tumefied glands were each as large as a hen's egg. The patient was trained to lie with his head pendent until he could do this for an hour each day without trouble. Heinleth then operated by raising a flap outlined by an incision curving from the middle of the horizontal branch of the lower jaw to the cornu of the hyoid bone, and then upward across the sterno-cleido-mastoid muscle to the rear of the mastoid process. He detached the periostium and sawed the bone with Gigli's wire saw, opposite the second molar. This allowed the extirpation of two glands each as large as a plum and numerous smaller ones. The lingual artery required ligation, but the other arteries, nerves and salivary glands were merely exposed and drawn out of the way. When no more infected glands could be found, the patient was laid flat on the table with his head hanging over the edge, and the buccal cavity was entered. As the palatal and pharyngeal arches were divided the hemorrhage was excessive until controlled by tampons, after which the tumor was easily shelled out. With it were removed the right half of the uvula and of the posterior wall of the throat, a portion of the soft palate and the anterior and posterior pillars of the fauces. The defect was nearly closed by stretching the mucous membrane of the cheek to meet that of the rear of the throat. A small portion left uncovered was tamponed and the gauze brought outside through the wound.

The patient was able to take fluid food the next day and recovery proceeded rapidly, but a month later the edges of the wound in the mucous membrane showed signs of recurrence of the sarcoma, confirmed by the microscope. The recurrence was treated through the mouth by electro-thermic cauterization of the entire soft palate, base of the tongue and side of the throat, the head pendent. The palatine artery required ligation. The raw surface was tamponed, the gauze brought out through the nose and through the fistula left from the previous operation. The patient was able to take fluid food almost at once. A granuloma developed near the Eustachian tube, but proved not to be malignant. The recovery was rapid and disturbed only by a mild erysipelas around the skin wound, which healed in a week under anthrarobin.

The patient has gained rapidly in weight and has no functional disturbances in swallowing or speaking. The sarcoma and the glandular metastases were of the round-celled variety; the primary tumor measured 2 by 4 cm. Fraenkel's method of excising the infected glands first, and then proceeding later to the extirpation of the primary tumor through the mouth, is only applicable to small tumors. The modified Kroenlein-Langenbeck method followed by Heinleth is sure of success, he insists, only when not preceded by preliminary tracheotomy. Every possible source of infection must be avoided and every effort made to insure simple after-treatment and adequate nourishment from the first. It has the advantage of widely opening up the field of operation without leaving functional or cosmetic disturbances, while the bone is protected from infection from the mouth. Danger of post-operative pneumonia is also avoided as the patient can be up and about by the second or third day. The operative mortality of the cases of malignant tumors of the tonsils that have been published averages 25 per cent. Kroenlein has operated on nineteen, nearly all in advanced stages; four died at once, but one is living seven, another three and another nearly two years since the operation without recurrence. Honsel one, after seven years and Fraenkel one, after five years. No case has been known of actual or relative cure from any medicinal measures, except Weinlechner's unique case of a tumor diagnosed as spindle-celled sarcoma, cured by iodoform-glycerin.

PHARYNX.

Retropharyngeal Abscess and Adenitis. One case of retropharyngeal adenitis, and two of abscess are reported by I. M. Snow.[1] The case of adenitis was in a one-month old baby, and followed an intense rhinitis. There was a pyramidal swelling about the level of the epiglottis, projecting forward from the posterior wall of the pharynx and in the median line. The mass was hard, neither movable nor fluctuating—an enlarged retropharyngeal lymph node. The treatment was mercurial inunctions, and gray powder, although there was no actual evidence of syphilis. Recovery followed in about two weeks.

The first case of retropharyngeal abscess was in a boy of 16 months, and appeared some three weeks after an attack of influenza. The head was held stiffly erect, and there was difficulty in swallowing and obstructed, snoring breathing, especially in bed. On palpation the left tonsil was found to be swollen, and behind it lay a fluctuating swelling. The mouth gag was introduced, the abscess aspirated, and afterwards incised and evacuated. Relief did not follow. The head could not be moved without pain, the muscles of the neck remained rigid, the child remained feverish and languid for some two weeks and was then attacked by a severe ileo-colitis. Recovery was slow, but at the end of six months health was perfect.

The second case of abscess was in a boy of 15 months, who on being exposed to a child with a sore throat, almost immediately was attacked with pharyngitis and tonsillitis. For a week the symptoms were not especially severe, the baby playing about the house by day, and sleeping well at night. The breathing was of a hoarse snoring character, and there would be attacks of choking when the child was laid in bed. The lymph nodes of the neck became enlarged, but swallowing and nursing were easily done. At the end of fifteen days there was an alarming attack

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(1) Arch. of Pediat., Jan., 1901.

of dyspnea, and the author saw the case for the first time. The child was breathing with the mouth open in a nasal snuffling way, but was able to nurse with apparent ease. There was no cyanosis, heart and lungs were normal, voice was not hoarse or croupy, cervical lymph nodes were enlarged—notably at the right angle of the jaw. On depressing the tongue with a spoon there was seen a full even bulging forward of the posterior pharyngeal wall, and the right tonsil was enlarged and pressed outward and forward by this swelling. On digital examination a large fluctuating swelling could be felt.

The case demanding operative treatment, assistance was called. The child was held in the lap, and the mouth gag introduced. He at once grew slightly cyanotic, and the gag was removed. After a few minutes the gag was again inserted, and the child again became livid, immediately stopped breathing, and was apparently dead. The gag was withdrawn having been in place but a minute. The patient was inverted and artificial respiration by every known method persisted in for some time, but without avail, death having occurred almost instantly after removing the gag. Autopsy was refused, but the swelling was opened when the pharynx was flooded with pus.

Commenting on the cause of death, the author says, "It will be remembered that for a week the child had suffered from attacks of dyspnea at night. During this time the abscess had steadily augmented in volume. The introduction of the gag stretched the jaws and pressed the root of the tongue back against the pharyngeal swelling. Whether the cyanosis and sudden death were due to pressure on the larynx or laryngeal spasm, or to sudden impairment of the function of the pneumogastric nerve is uncertain, but as suffocation usually occupies two or three minutes, and the baby apparently expired immediately, efforts at resuscitation being futile, it is probable death was due to disturbance of the vagus." A case of Emmett Holt's is cited, in which on using the mouth gag, an infant of seven months was suddenly asphyxiated. The gag was immediately removed, intubation was performed and the child revived after artificial respiration had been done for several minutes.

These cases seem to be due to the inflammation and suppuration of the retropharyngeal lymph nodes, which form a chain from the upper part of the pharynx to its junction with the esophagus on either side of the median line. They are most prominent in infancy and rapidly diminish after the third year. The affection is a disease of early life, 83 per cent of Bokai's cases being under two years of age. The symptoms are easily misunderstood. There is difficulty in swallowing, the voice is frequently modified, the cry is nasal, the breathing snoring and snuffling in character, and the mouth is open. If the abscess is deep down in the pharynx the breathing may be stertorous with attacks of choking or cyanosis. The abscess is commonly found at the side of the pharynx, behind or below the tonsil, and less commonly in the median line. It may or may not be visible on inspection. Palpation with the finger should always be done in suspected cases and done quickly since it may cause vomiting or choking.

"Once recognized, no time should be lost in evacuating the abscess. Spontaneous opening is not common, ocurring in but 19 of Bokai's 144 cases. Retropharyngeal abscess, unrecognized and untreated, usually ends in death. If rupture occurs, the baby is suffocated by pus aspirated into the lungs. Death is generally due, not to slow suffocation, but to asphyxia from pressure on the larynx, from laryngeal spasm, or to disturbance of the pneumogastric." The abscess may be incised through the mouth, first drawing off a portion with an aspirating needle, and afterwards enlarging the opening with a bistoury. External incision is not advised. The author states that Holt opens the abscess with a sharpened finger nail.

Richards has recently had a case of retropharyngeal abscess in a child of 11 months, which was brought to him with the statement that it was in stress for breath on account of a tumor in its throat. On depressing the tongue the pharynx was found full of mucus, and a satisfactory examination was impossible. By palpating with the finger, a fluctuating swelling was discovered in the median line, a little to the right and immediately behind the tonsil. The child was immediately inverted, a number of rapid cuts made with the nail of the right fore-finger, and the abscess forcibly opened. The opening was then enlarged sufficiently to drain the abscess. The child gasped for breath and for a few moments it was doubtful whether it was alive or dead. It soon began to breathe however, and the pus being all evacuated, recovery was rapid and uneventful. He feels certain that had a mouth gag been used in this case, and an attempt made to open the abscess by more approved surgical methods, he would have had a dead child. While the finger nail is not an aseptic or scientific surgical instrument, there are times when it is the most available instrument at our command.

Acquired Syphilis of the Pharynx. This is discussed by Parker.[1] The primary lesion is fairly frequent and is usually located on a tonsil. Secondary syphilis arises as erythema, mucous patches, and superficial ulcerations. The tertiary manifestations are (1) gummata, circumscribed and diffuse, (2) ulcerations, (3) scars, contractions and adhesions. The adhesions are usually of the following forms: (a) Adhesion of the posterior pillar of the fauces to the posterior pharyngeal wall, causing a dragging of the uvula and palate to the affected side. (b) Unilateral adhesion of the palate to the posterior pharyngeal wall. (c) Adhesion of almost the entire palate to the posterior pharyngeal wall. (d) Total atresia. (e) Adhesion between the base of the tongue and the posterior pharyngeal wall. (f) Adhesion of the velum to the base of the tongue. As treatment is recommended, iodid of potassium internally, with mercurial inunctions and gargles.

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(1) Lancet, Jan. 26, 1901.

A. Koenig[1] reports a case of adhesion of the soft palate to the posterior wall of the pharynx, secondary to ulcerative sore throat, which had lasted twenty-three years. He operated with an instrument having the general curve of a Gottstein curette, and a double lateral cutting edge. A hollow silver plug was used to prevent union of the cut edges after operation. Healing was complete in three weeks.

Foreign Body in Pharynx. G. Ferreri[2] of Rome reports a case of foreign body, an amber mouth-piece, measuring 5.5 cm. long by 13 mm. broad, imbedded in the pharynx for four months, located by means of the X-ray and removed by forceps through the mouth.

LARYNX.

Nervous Disorders. In a comprehensive monograph of 40 pages and including 141 references to the literature, J. Sendziak[3] discusses the *laryngeal disturbances in the diseases of the central nervous system,* with a special consideration of laryngeal disturbances in tabes dorsalis. His observations are based upon his findings in examination of the larynx in 154 cases of various diseases seen in the Warsaw hospitals. This abstract will be limited to a brief consideration of the second portion of the monograph—the disturbances in tabes. Sendziak examined the larynx in twenty-two cases and the findings in these cases are described. Of the twenty-two cases, eleven presented more or less disturbance, namely, nine times paralysis and twice ataxia of the vocal cords. As regards the paralysis, two were paralysis of the recurrent (one case was complicated with aortic aneurism) two bilateral posticus paralysis, two right-sided posticus paralysis, three incomplete paralysis (paresis) of the posterior crico-arytenoid muscles (twice right-sided paralysis and

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(1) Phila. Med. Jour., Feb. 16, 1901.
(2) Ann. des Mal. d'Or., etc.
(3) Ann. Otol. Rhinol., etc., May, 1901.

once left-sided). The particular laryngeal disturbances in tabes are: 1. Those of sensation (hyperesthesia, anesthesia, paresthesia). 2. Those of motility (laryngeal crises, ataxia of the vocal cords, and laryngeal paralysis). Those of sensation belong, generally speaking, to the rarer forms; of greater importance are the disturbances in the motor sphere of the larynx, to which particularly belong the so-called *"crises laryngees."* They are simply spasms of the abductors which ordinarily are the result of irritation present in the larynx, or may be produced by slight pressure on the thyroid cartilage or on the crico-thyroid ligament at the point of exit of the superior laryngeal. They are occasionally observed during psychic or physical excitement. The symptoms vary from spasmodic coughing in mildest cases to dangerous dyspnea requiring tracheotomy. At times, in fact, death results.

The treatment consists in the local application of a 20 per cent solution of cocain; sodium bromid internally and inhalations of chloroform or ether during the attack. In ataxia of the vocal cords or defective co-ordination of the laryngeal muscles the vocal cords show a tendency to retract in that they halt half way between the positions of phonation and inspiration. Ataxia never occurs during quiet breathing. Most important, however, are the paralyses; Sendziak observed them eight times in twenty-two cases. He has collected forty-five other cases and refers to Burger's earlier collection of seventy-one cases. From these statistics it is evident that the paralyses in tabes almost exclusively affect the abductors. Posticus paralysis, unilateral or, oftener, bilateral, must be regarded as a special symptom of tabes and it is worthy of notice that laryngeal paralysis may for a long time precede the other objective symptoms—absence of patellar reflex, ataxic gait, etc. This demonstrates the importance of laryngeal examination in every case of nervous disease.

J. E. Rhodes[1] reports a case of *paralysis of the larynx,*

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(1) **Jour. Am. Med. Assoc.**

occurring in a male railroad employe, 35 years of age. The complete diagnosis was an ascending sclerosis of locomotor ataxia causing ptosis of the right eyelid and divergent squint of the right eye, paralysis of the left half of the palate, and abductor paralysis of the right vocal cord. On examination of the larynx, the right vocal cord was stationary in the median line, there being a paralysis of the posterior crico-arytenoid on the right side—the abductor of the vocal cord. All other conditions of the throat were normal. In this patient the previous history was good—no bad habits or history of specific trouble. He had suffered from sharp lancinating pains in the lower extremities, habitual constipation, and frequent micturition that could not be well controlled. He complained of a slight tickling sensation in the larynx, which occasionally excited cough.

W. Shutter[1] reports the case of a 19-year-old servant girl suffering from *anesthesia of the left side of the head with hoarseness.* She was under observation at intervals from December, 1894, to May, 1900, in the University Hospital. Examination December, 1894, revealed nothing of note except an insensibility of the left half of the larynx and paresis of the left vocal cord. There was no sign of preceding inflammation either in or about the left crico-arytenoid cartilage, as a cause of the paralysis. Hearing was normal. The nasal mucous membrane was anesthetic on the left side with the exception of two places on the floor and septum. Sense of smell was alike on the two sides. Treatment with insufflation, hydro-therapy, electricity and massage for two months cured the anesthesia, except that of the skin of the left side of the head.

After three-and-a-half years the patient was again examined, August, 1898, and the same finding obtained as on the first examination. The same condition was again observed in May, 1900. There was no atrophy of the left vocal cord, although the right cord apparently over-

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(1) Fraenkel's Arch. f. Laryngol., 1901, Vol. XI, p. 469.

rode, a trifle, the median line and the voice was less hoarse. Electrical reaction confirmed the belief that the lesion was cerebral, the proof of which autopsy alone can reveal. The author incidentally reported the loss of the finger nails of three fingers of the left hand and two of the right during the year 1899.

E. Richter[1] has devised an electrode for *treating the recurrent nerve* on a new principle, *i. e.,* applying the electricity directly to the trunk of a motor nerve with a very much weaker current than is usually employed. In case of hyperexcitability, weakness or paralysis of the laryngeal muscles, they can be stimulated by the direct application of the primary current. The electrode for this purpose consists of two separately insulated soft, fine hair brushes mounted on copper wires, and dipped in a 10 per cent solution of sodium bromid, and potassium iodid. This bipolar electrode is light, easily handled and does not hurt the larynx, while it can be sterilized by boiling. It can be changed to a unipolar electrode by connecting it with a single wire. The primary current is applied for five seconds; two to five milliamperes are ample. When the nerve, instead of the muscles, is to be treated, the continuous or sinusoidal alternating current is preferable, and the electrode for this purpose is shaped like a curved sound. It is inserted through the nose into the pharynx where it is turned until it lies along the side of the pharyngeal wall, or a larger sound can be inserted through the mouth and used behind the tonsil. At this point the branches of the vagus can be directly stimulated by the electricity and also the immediate vicinity of the main trunk. If the anode is thus introduced and the cathode is applied over the apex of the heart, with a current of two to five milliamperes, the heart pulsates more slowly by sixteen to twenty beats in the minute, as Richter found by experiments on himself. Tests with this anode in the pharynx and the cathode on the ulnar nerve at the elbow, or applied to the posterior margin of the sterno-

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(1) Archiv. f. Laryngol., XI, 3.

cleido-mastoid muscle, demonstrated the feasibility of this stimulation of the trunk of motor nerves with a very weak current. Reversed currents seem to be ineffective. The cathode must be applied to the muscles that require treatment. An extremely weak current is sufficient when the anode is in the pharynx and the cathode in the larynx; a little stronger current for intralaryngeal action, and a current five to ten times as strong as the first, to induce percutaneous contraction of the muscles, applying the electricity near the thyroid cartilage. In case of very sensitive patients, the anode can be inserted in the pharynx and the cathode applied to the side of the thyroid cartilage. These electrodes will be found useful in diagnosis, and for the treatment of vocal and respiratory troubles from weakness or paralysis of the muscles from any cause, and of motor or sensory weakness or paralysis of the nerves. Hysteric troubles are peculiarly amenable to this treatment, as also mogiphonia, aphonia and dysphonia, besides the laryngeal troubles accompanying tabes, syringomyelia and other affections of the central nervous system. The muscles of the larynx can also be influenced and made to contract by placing the cathode in the throat and the anode in the anus.

G. Aron[1] maintains that *hysteric aphasia* really exists, and assumes the same forms as aphasia of organic origin. It sometimes takes the form of a special kind of aphasia such as pure verbal blindness, verbal deafness, etc. Its beginning is abrupt, as is its disappearance, and its duration is short; consequently the intelligence remains intact. The disease recurs and coexists with stigmata of hysteria. As to its pathogeny there are numerous hypotheses, among which the most recent is that of engorgement of the cerebral centers. Prognosis is good, cure may come without treatment and spontaneously, but is sometimes assisted by reëducation in speech.

D. Green[2] presents a table showing the results of the

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(1) Bull. de Laryngol., etc., March 8, 1901.
(2) N. Y. Med. Jour., April 13, 1901.

examination of 256 adult stammerers, 229 of whom were males and 27 females. The classification of the various forms of stammering has been made to depend upon the particular region of the vocal tract in which the faulty action causing the speech defect takes place. The table shows that faulty inspiration was the cause of stammering in about 61 per cent in males and only 11 per cent in females. The most prolific source of stammering among men is a tendency to misdirected effort in the diaphragm, a condition, which the table shows, is rarely found among women. This is quite natural, for in the male ordinary quiet respiration is effected almost exclusively by the activity of the diaphragm; but in speaking, a more considerable emptying of the quantity of air in the lungs must take place, and this can only be effected through the combined processes of diaphragmatic and costal breathing. In the female costal breathing is the habitual mode of respiration, and hence the lungs are generally well supplied with the quantity of air which is necessary for speaking purposes, and, in cases of stammering caused by faulty inspiration, this would account for the great preponderance of male stammerers over female.

The proper early training of young children would prevent the development of *defective speech* in a large proportion of cases according to G. H. Makuen.[1] The general health should be kept in the best possible condition. Baby talk should be encouraged only up to a certain point, and children should not be talked to in any but the best speech beyond a very early age, since all speech is a matter of imitation, and they imitate what they hear. Stammering is an acquired defect, not congenital nor inherited beyond the fact that certain nervous conditions may predispose children to this affection, and in case a child's ancestors have stammered he should be very carefully managed. The attention of the child should never be called to the defect, nor should the word

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(1) Phila. Med. Jour., Feb. 2, 1901.

stammering be used in his presence, since a nervous dread of the affection is easily acquired. In its correction, and in all forms of imperfect articulation, each element of speech which is defective should be taken up separately, and the patient taught how to acquire the correct position of mouth, lips, tongue and palate for the enunciation of those sounds, and close attention should be given to the character of each sound he utters.

In the case of the stammerer, it is not strictly a form of defective speech, since his difficulty is not with thought, but with his power of expressing that thought. He thinks in words, but cannot speak in words. The stammerer has little difficulty in talking when alone or in the presence of dumb animals, and the author thinks that all stammerers can swear. Stammering is often brought on suddenly by a severe shock to the nervous system, due to the fact that the motor processes of speech are carried on mainly in the bulb and spinal cord, and anything interfering with this process will naturally result in disordered speech. The nose and throat and the condition of the tongue should, in all cases, be carefully looked after, but surgery has no value beyond the correction of actual deformities of the organs. The treatment of stammering, as of other defects, must be, in the main, educational. The nervous mechanisms of speech must be reached through the training of the muscles supplied by those nerves and employed in the processes of speech, the aim in all cases being toward volitional control of the muscles. Ingenuity is required in the individual case, and only persons of great patience and perseverance are suited to work over, and treat these cases under the guidance of the physician.

G. Spiess[1] points out that certain vocal disturbances are not only not made worse, but are directly *cured by exercising the voice.* Also that the efforts of various singing teachers to enforce their individual "method" on each pupil, without regard to the anatomic variations be-

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(1) Fraenkel's Arch. f. Laryngol., XI, 2, 1900.

tween individuals, is responsible for the ruination of many voices. The vocal cords are out of order when the voice is hoarse in speaking, although the singing voice may be perfectly clear. Redness of the cornicula and of the under surface of the epiglottis is characteristic of incorrect tone-formation. He has found humming the consonants m, n, v, s, a good exercise preliminary to singing. When the subject continues to use his voice, notwithstanding the so-called vocal trouble, the accessory muscles in the epiglottis, tongue and neck are used for the purpose more or less, and after the vocal cords have returned to normal this habit of false muscle action is liable to persist.

Angina Epiglottidea Anterior. That this affection is very often primary and is an acute infectious disease for which the name acute infectious epiglottitis is suggested as more scientific and appropriate, it is the aim of C. F. Theisen[1] to establish in a paper on the subject. Four cases are reported. Owing to anatomic conditions, the author shows, only the anterior surface of the epiglottis, with its abundant submucosa, is involved in the edema for which the tightly adherent mucosa of the laryngeal surface affords but little opportunity. Bacteriologic examination in the author's cases showed a mixed infection in which he believes the pneumococcus (probably a special edemagenic variety of that organism), is the etiologic factor. In the few recorded cases in the literature, no bacteriologic evidence of value has been adduced. The diagnosis rests upon the uniform redness and swelling of the anterior surface of the epiglottis, the sudden onset, the dysphagia and fever. The treatment consists chiefly of a spray of iced 5 per cent ichthyol solution, an ice pack, and cracked ice. Scarification is sometimes beneficial.

Inflammation.—Rheumatic. The localization of acute inflammation in the crico-arytenoid joint is a well established fact, according to St. C. Thomson.[2] It may precede

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(1) Jour. Am. Med. Assoc., Jan. 19, 1901.
(2) Laryngoscope, Jan., 1901.

a generalized attack of acute rheumatic fever, and until the latter appears the diagnosis is sometimes difficult; it may occur during the course of the acute illness and it may be met with as an independent affection. The patient generally complains of some pain and dysphagia, with tenderness on palpation of the region of the crico-arytenoid joint, that is, the outer and upper border of the thyroid cartilage. The pain is worse when the patient is recumbent, particularly if he swallows when in that position. Inspection with the laryngoscope may reveal nothing in the early stages, or until the soft parts over the articulation have become inflamed, when they may be seen red and swollen. The movement of the vocal cord on the same side is at first sluggish, and is said by some to be jerky. With the development of inflammation or of effusion into the joint, the vocal cord on the same side becomes fixed. We are then met with the difficulty of diagnosis between a rheumatic crico-arytenoid inflammation, and paralysis of the recurrent laryngeal nerve. In many instances, the following symptoms, tabulated by Escat, will help in distinguishing the two conditions: 1. Dysphagia. 2. Painful cough. 3. Occasional tumefaction over the arytenoid. 4. Sharp pain on pressure along the posterior border of the thyroid cartilage. 5. The healthy arytenoid is not tilted forward on the affected one, and (according to Grabower) the healthy vocal cord does not during adduction, pass across the median line toward the other side. In addition, this affection of the crico-arytenoid joint is usually associated with (a) the existence or pre-existence of an acute pharyngeal catarrh, (b) laryngeal hyperemia, (c) a more or less pronounced feverish condition, and (d) extra-laryngeal manifestations of arthritis.

When recovery takes place more or less permanent disturbance of motion may remain in the form of partial or complete anchylosis. The difficulty of diagnosis in this condition is analogous to that which we should experience in distinguishing between anchylosis of the shoulder joint and paralysis of the deltoid, if we were unable to manipulate the patient's arm. It can often be made only when the vocal cord is in a fixed position, which is atypical of muscular or nervous play. Permanent thickening in addition to the abnormal fixation, would be suggestive of periarthritic inflammation. As a rule it is better to carefully exclude the possibility of any central or peripheral paralysis before ascribing the fixation of a vocal cord to complete anchylosis of the crico-arytenoid articulation. Even then other causes, such as syphilis have to be carefully excluded. The treatment of this rheumatic anchylosis is generally hopeless.

Tuberculosis. Jonathan Wright[1] presents a paper on problems in etiology, diagnosis and treatment of tuberculosis of the upper air passages. The author says that the tissues possess powers of resistance in certain localities which they do not have in others. Tuberculosis is very infrequent in the nose, comparatively so in the pharynx, more frequently found in the larynx, and most common of all in the lungs. The diagnosis of tuberculosis of the larynx requires, as a rule, not only the local examination with the eye, but also the history of the patient, and may easily be confounded with syphilis of the larynx, though there is usually no difficulty if the observer is on his guard, and death should not occur from syphilitic laryngitis. Iodid of potassium and mercury are valuable diagnostic aids, and the sputum examination should not be neglected. Local and climatic treatment are both to be used when possible. Up to the present time but little has been accomplished in the way of recoveries, nor have the various methods of treatment done much toward permanent recovery, although much has been done and can be done toward palliation of the symptoms. Lactic acid, iodoform and orthoform applied locally, and the intralaryngeal and intratracheal injection of various oils frequently, for the time at least, help the pain and cough. Opiates internally are justified and sprays keep the sur-

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(1) **Medical News, Jan. 19, 1901.**

faces clean. Occasionally the patient will be benefited by removal with cutting forceps and curette of the granulations and affected tissue, especially when the surface vegetations cover ulcers.

The author regards the temporizing optimism which suppresses what the reporter knows to be the whole truth to have been a great detriment to the conscientious study of this terrible disease, and hopes that the unflinching and conscientious adherence to what one believes to be the whole truth will enable the future to find the cure for tuberculosis in man which we do not now possess.

The use of phenosalyl in laryngeal tuberculosis is discussed by von Stein.[1] Phenosalyl is the name given to a mixture devised by Christmas, composed of:

Acid. Carbol.	9.0
Acid. Salicyl.	1.0
Acid. Lactic.	2.0
Menthol	0.1

In a series of experiments as to its antiseptic qualities, phenosalyl was second only to bichlorid of mercury, and it is less poisonous. It is prepared in the following manner. The measured amounts of carbolic and salicylic acids are placed in a dish and heated over a water bath until the salicylic acid is dissolved, after which the other ingredients are added. The mixture is used in 3 and 5 per cent glycerin solutions. In laryngeal tuberculosis it was applied after previous cocainization in 5 per cent solution. Its action was extremely satisfactory, relieving the dysphagia almost immediately, and in the majority of cases causing a marked improvement in the local lesions.

Among nasal affections its action was most pronounced in coryza, the application of a 3 per cent solution frequently cutting the attack short, and in chronic rhinitis where it was applied after cocainization in 5 per cent solution. In the latter affection the remedy brought about

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(1) Klin.-Therap. Woch., Oct. 28, 1900.

striking improvement in numerous obstinate cases characterized by hypertrophy and abundant discharge.

L. Vacher[1] advocates the use of *intratracheal injections of an ethereal solution of iodoform* in this affection:

Saturated solution of iodoform in ether	100 cc.
Guaiacol	5
Eucalyptol	2
Menthol	1

He claims that 2 cc. of this solution may be safely and almost painlessly injected into the trachea without producing laryngeal spasm, and that distress is relieved and the general health improved under this treatment.

N. Taptas[2] contributes an article on the *surgical treatment of laryngeal tuberculosis.* He reports a case of tuberculosis of the larynx involving the left ventricular band and aryepiglottic fold, the left vocal cord being covered with granulations. The patient was 47 years of age, the family and previous histories negative. The present illness began with intermittent hoarseness three years previously, becoming pronounced a year later after an acute attack of pleurisy and bronchitis. Emaciation was extreme, the weight having fallen from 97 to 48 kilos. In the region of the larynx was a fluctuating tumor of the size of a small orange and ready to open at a point where the skin was tense and yellow. The lateral dimensions of the larynx were normal. Lungs were negative, temperature 37-38 C.

After introducing an O'Dwyer's tube an incision was made in the median line and the walls curetted deeply. The left lamella of the thyroid cartilage was found necrosed, allowing a communication of the external abscess with the interior of the larynx. Prolonging the incision to include the first rings of the trachea, and inserting a Trendelenburg canula Taptas then removed with curette and scissors the greater part of the left side of the

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(1) Semaine médicale.
(2) Ann. des Mal. d'Or., etc., May, 1901.

larynx. He scraped out in pieces as large as hazel-nuts, calcified tubercles which filled the ventricle of Morgagni. To insure entire removal of all diseased portions, he resected a large part of the cricoid cartilage, cauterized the surface of the wound with the thermo-cautery, and tamponed with iodoform gauze.

After two-and-a-half months the patient is in perfect condition, having gained 22 kilos in weight. On laryngoscopic examination the right half of the larynx is normal in appearance with the exception of a slight redness. Its motility is perfect and there is no sign of infiltration. The left half, which was operated on, was, of course, immobile and contracted, narrowing somewhat the lumen of the larynx, but all inflammation seemed to have ceased. The Trendelenburg canula was still in place, the author planning to remove it later by a plastic operation.

In answer to the question as to the indications for such intervention in the future, Taptas cites the literature at length, the general conclusions from which were, hitherto, for the most part unfavorable to thyrotomy, as not accomplishing more than simple tracheotomy, which, although done for the sole purpose of averting death from suffocation, has availed not only to ameliorate the local conditions of the larynx, but to cause expectoration and pulmonary symptoms to disappear. Since tracheotomy in laryngeal tuberculosis exerts its favorable influence by giving repose to the larynx, and affording free oxygenation of the blood, favored by respiration through a large and always patent canula, of course thyrotomy would do the same with the additional advantage of removing the seat of infection. Between thyrotomy and tracheotomy the author concludes that in cases in which the laryngeal tumor may with probability be imputed to an edema rather than an infiltration, one should be content with tracheotomy. So also in those cases of laryngeal affection which evolve rapidly, or when the extent of the disease is still undefined and the condition of the lungs is uncertain. But in the case of an old tuberculosis with a calcified tumor more or less localized upon the ventricular bands, with or without participation of the epiglottis or the arytenoids, thyrotomy should follow tracheotomy at the same sitting after the introduction of a canula and tampon, and should allow of the curetting and thorough excision of the diseased portions and cauterization of the surface of the wound.

G. Trautmann[1] urges the early diagnosis and *removal of tubercular tumors of the larynx.* They occur more frequently than is generally appreciated, both solitary and multiple, usually in youth. They cause no pain, and merely affect the voice. They may be located in the ventricle, under the angle of the glottis, on the posterior wall, very rarely on the false vocal cords and still more rarely on the true cords. They can be differentiated from other tumors by the absence of any tendency to ulceration. The discovery of fibro-epitheliomatous elements should suggest the probability of a tubercular tumor. Removal is followed by marked improvement in many cases and by complete cure in others, especially if the tumor is primary.

A. Fasano[2] is inclined to consider *thiocol a specific against tuberculosis,* at least in the larynx. He found that patients with pulmonary or laryngeal tuberculosis were very much benefited by the internal administration of thiocol, and consequently he applied it as a local remedy. The insufflations were made with 10 to 15 cg. thiocol, 40 cg. cocain and 1 gm. boric acid. He reports three cases of primary laryngeal tuberculosis cured after a few months of this treatment, supplemented by an operation in one case. Also seven out of eleven cases of secondary infection, all operated on.

W. Freudenthal[3] describes the treatment adopted by him at the Montefiore Home. In pre-tuberculous laryngitis great care is to be taken to treat the anemic or hyperemic mucous membrane. In the anemic stage in-

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(1) Archiv. f. Laryngol., XII, 1.
(2) Klin.-therap. Woch., 1900, 22.
(3) Ann. of Otology, etc., Feb., 1901.

sufflations of zinc sozoiodol with sugar of milk, applications of nitrate of silver in 3 per cent solutions, liquor ferri sesquichlorid (1.0 to 30.0) and Peruvian balsam with spiritus vini rectif. In the hyperemic stage, creosote 0.5, spirits vini 10.0, glycerin 50.0 with appropriate inhalations. After a long experience with lactic acid its use is unreservedly condemned and the following plan adopted. After cleansing the larynx a powder of saccharated suprarenal gland (3 to 6 grains) is insufflated. This is followed by the menthol orthoform emulsion: menthol 1.0, 5.0, 10.0, 15.0, ol. amygdal dulc. 30.0; vitelli ovorum 25.0; orthoform 12.5; aq. dest. q. s. ad 100.0. Begin with 1.0 per cent menthol and increase to 10.0 per cent as the toleration of patient permits; 15.0 per cent is used in rare cases only. In some cases in which other remedies cannot be borne, olive oil, one glass one-half hour before breakfast, makes swallowing easier. For the bronchial cough he uses heroin.

The treatment of tuberculosis of the larynx is fully and sensibly discussed by Sendziak.[1] In cases treated with orthoform he has observed not only an analgesic action, but also a favorable action upon the tuberculous lesions themselves. The drug is applied either as a powder or as an emulsion with menthol according to Freudenthal's formula. Lactic acid gives good results in selected cases. The drug must be applied energetically by rubbing. The intervals between the applications should be of sufficient length (one to two weeks) to allow the complete separation of the dead epithelium. Other efficacious remedies are phenolum sulphuricum in 20 to 40 per cent solution in the treatment of ulcerations; parachlorphenol applied in 5 to 10 per cent solutions in glycerin; parachlorphenol, however, frequently provokes vomiting; menthol in 10 to 20 per cent oily solutions. The writer gives an extensive list of other remedies.

J. H. Coulter[2] contributes a paper upon the same sub-

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(1) Jour. of Laryngol., May, 1901.
(2) Ann. of Otology, etc., Feb., 1901.

ject, in which he extols guaiacol either as an application or according to Donnellan's method of submucous injection (*Lancet,* 1898, July 14). He begins with a 20 per cent solution and increases it to 80 per cent within two weeks. Before the use of the guaiacol the larynx is cleansed with an alkaline spray and an anesthetic of holocain 1 per cent, and antipyrin 1½ per cent applied.

Syphilis. According to Aubin[1] hereditary syphilis of the larynx is more frequent than is generally believed. Frequently laryngeal affections return and persist in children and simulate chronic tracheo-laryngitis, while they are only laryngeal lesions of hereditary syphilis (ulcerating gummata, etc.), whose nature is usually misunderstood. Diagnosis of these lesions is possible by a single laryngeal examination. The presence on the patient's body of specific lesions or dystrophic stigmata is an element of great advantage in doubtful cases. These laryngopathies are of grave prognosis, especially since they affect the function of the organ, and because they give rise to progressive stenoses that may lead to fatal results. They are remarkably influenced by specific treatment (iodin in large doses, hypodermic injections of the biniodid of mercury). The cicatricial contractions justify surgical treatment.

Stenosis. The following case of *stenosis of the larynx following fracture* is reported by A. W. Watson.[2] A boy of 16 years, on May 6, 1899, while riding his bicycle, ran into the tail-board of a wagon, striking his neck over the thyroid cartilage and sustaining a lacerated wound beneath the chin. He went to a near by hospital where three stitches were put in the chin cut and he was then allowed to go home. The voice was lost immediately after the accident and he had cough and bloody expectoration for three days, but no dyspnea. He had also dysphagia. When he became able to swallow, food would enter the larynx, causing paroxysms of coughing. Six

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(1) Bull. de Laryngol., etc., March 30, 1901.
(2) Laryngoscope, July, 1901.

weeks afterward he developed dyspnea which increased up to July 14, when the author first saw him. His voice was reduced to a hoarse whisper. External examination showed some flattening of the thyroid angle and a recent scar beneath the chin. Laryngoscopy showed adhesion between the ventricular bands except a small opening posteriorly. The supra-arytenoids were drawn together and inwards and the vocal cords were invisible. The adhesion between the bands was cut and a few days after a large intubation tube introduced, which was later exchanged for a hard rubber tube, and on September 15 a larger metal tube was introduced which was kept in until October 10.

Having received no real benefit from this procedure a preliminary tracheotomy was performed on the last date, and a week later the patient was sent home wearing a tracheal tube. November 5 an operation for laryngofissure was done. When the wings of the thyroid were reached and separated, it was found that from the thyroid notch to below the vocal cords, the cartilage was about a quarter of an inch thick, the thickened portion extending backward about a third of an inch, pushing the ventricular bands upward, and the anterior commissure of the vocal cords backward. The redundant tissue was cut away from the wall of the larynx, and shelled out. A catgut stitch was passed through the thyroid cartilage and the ends of the vocal cords, and tied, and the skin wound sutured. The patient was allowed to go home November 13, still wearing the tracheal tube. The tube was kept corked part of the time, and later when the tube had been kept corked continually for two weeks, it was removed and the opening allowed to heal. At present the voice is clear and strong and the breathing perfectly free, the boy being able to work and do as he pleases.

Alapy[1] is reported as having successfully treated a case of laryngeal stenosis following intubation, *by a Thiersch graft,* after dilation with elastic bougies had proven futile.

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(1) Centralb. f. Chir., No. 52, 1900.

The larynx was opened by laryngo-fissure, and the constricting cicatrix at the level of the cricoid was dissected out, leaving a circular wound, in the floor of which the cricoid cartilage and the first ring of the trachea lay exposed. This wound was then covered with a Thiersch graft held in place by a cylindrical roll of gauze which was stitched to the larynx. The graft healed perfectly. In a short time the patient could breathe freely so that the tracheotomy wound could be closed. On recovery some hoarseness persisted.

I. A. Abt[1] reports a case of laryngeal stenosis, developing after two days of gradually increasing dyspnea. Efforts to introduce the intubation tube proved unsuccessful on account of an obstruction encountered in the larynx. Tracheotomy was performed followed in twenty-four hours by death. The autopsy showed the lumen of the larynx greatly diminished, open posteriorly, and the mucous membrane covered by a smooth, white, glistening, adherent membrane. Cultures made from the secretion found in the larynx, by W. J. Class revealed the diplococcus described by him as diplococcus scarlatinæ.

Intubation. Rahn[2] has altered the shape of the tube and rendered intubation so simple, he claims, that the general practitioner can accomplish it without the aid of a specialist. His tube is rounded at the lower end, has a narrower portion at the point corresponding to the thyroid cartilage, and flares into a funnel above, the edge cut off slanting toward the front. Not far from the top a metal hook projects inside the tube, only slightly obstructing the lumen. The tube is inserted by means of a Krause snare, the canula carrying the wire being about eight centimeters long with a beak very similar to that of a Eustachian catheter. The wire hooks over the metal peg on the posterior wall of the tube and is drawn tight until the tube fits close against the canula in which the wire loop runs, thus forming a solid extension of the

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(1) Pediatrics, June 15, 1901.
(2) Muench. med. Woch., Sept. 10, 1901.

canula. The child in the dorsal decubitus on the bed, the gag in his mouth, one assistant holds the head still and another the hands and feet. The physician holds down the tongue and pushes the epiglottis out of the way with the left forefinger. The tube can then be inserted with ease. The wire loop is released in the usual way. The tube can be removed by reversing the process, inserting the loop projecting from the canula, hooking it over the peg and drawing it tight. See Figs. 22-25.

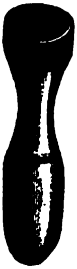

Fig. 22.

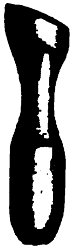

Fig. 23.

In order *to prevent auto-extubation,* F. Schlectendahl[1] advises that the thread attached to the tube, by which, in case of necessity, the tube can be quickly and easily withdrawn, be passed through the child's nose in-

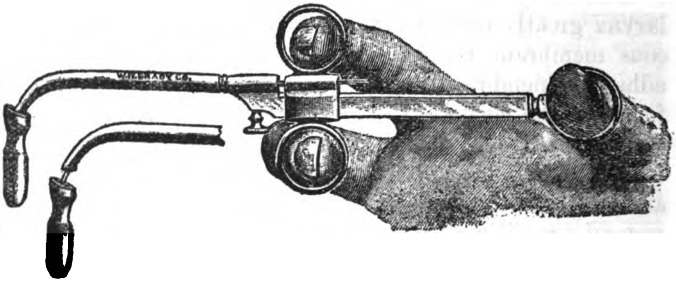

Fig. 24.

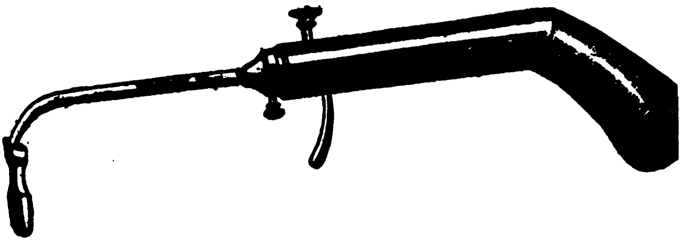

Fig. 25.

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[1] (1) Münch. med. Woch., April 30, 1901.

stead of its mouth. By means of a piece of court-plaster or collodion the free end of the thread is fastened to the nostril and if, in addition, the child is compelled to wear mittens, it is safe from picking fingers as well as from tongue and teeth. To remove the tube quickly the forefinger is passed into the throat, the thread, meantime, having been disengaged from the nostril by the other hand, is easily drawn downward and backward and the tube, almost at the same time, drawn out. By this device the author asserts that the too frequent, disagreeable and often fatal accident of auto-extubation will be largely avoided.

J. Trumpp[1] recommends the more frequent employment of intubation by the general practitioner, but only after the necessary dexterity is acquired by experiment upon the cadaver. The author describes the technic of the operation and commends its simplicity. The merits of the different varieties of O'Dwyer's tubes in the market are discussed, and the superiority of the hard rubber tube over that of metal, the author thinks is evident. He, however, suggests some minor changes in the shape of the tube, particularly a slight incurvation backward from the middle swelling. A somewhat flexible instead of a rigid obturator is also suggested.

Johann von Bokay[2] reports four cases of false passage of the tube, with the postmortem findings. References to the study of the subject by Variot, Heyman and others are also made. The diagnosis of false passage, he says, is made easy by one cardinal symptom, that respiration does not become freer after introduction of the tube, but on the contrary ceases entirely after a short lapse of time. On palpation at the entrance of the larynx the head of the tube will be found to be in an oblique position, and in some instances the lower end of the tube can even be felt through the skin. Hemorrhage, emphysema and abscess are the usual consequences and perichondritis thyroidea

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(1) Jour. Am. Med. Assoc., Jan. 26, 1901. Trans. by L. Fischer.
(2) Jour. Am. Med. Assoc., Jan. 26, 1901.

and cricoidea may easily develop into pyemia. The prognosis of false passage is bad. The prophylaxis consists in a faultless technic, acquired only by practice on the cadaver, on animals, or as opportunity offers, on children without stenosis, but with, mayhap, a fistula. The operation should never be attempted unless the operator has had abundant and most careful training. As to position, von Bokay recommends the upright one with the patient sitting in the lap of the nurse, contrary to Heubner who allows the patient to lie down flat. Treatment of false passage when made consists, according to the author, in removal of the tube, and the performance of a secondary tracheotomy, although Levestre and Martin advise a renewed attempt at intubation which is usually futile.

Laryngectomy. Von Heippal[1] calls attention to the modern improvements in technic, by which the mortality in this operation has been reduced from 41 per cent to 10 per cent. The chief of these is the employment of the tracheal tamponade of iodoform gauze, by which the aspiration pneumonia which often followed the old method, is prevented. He traces the development or evolution of the modern technic through the various measures which have been undertaken to meet the dangers which beset this operation. Kocher's preliminary tracheotomy with the employment of the Trendelenburg and Rose positions; the primary suture of the pharynx wound devised by Poppert to protect the esophagus and mediastinum from infection; the prophylactic resection of the trachea according to Gluck's method, the stump of the trachea being thus isolated from the wound; and finally the restoration of the continuity of the air passages by the Foederl operation of uniting the stump of the trachea by a strong suture to the hyoid bone. A case reported by Foederl[2] from the clinic of Gussenbauer, was dismissed cured in fourteen days. Von Heippal reports a case of his own in which he did the Foederl operation, which, however, was not successful

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(1) Arch. fur klin. Chirurg., Bd. LXIII.
(2) Archiv. f. klin. Chir., Bd. 58.

in that sloughing and gangrene of the tracheal stump supervened and the wound in the pharynx failed to unite. After many weary weeks the patient made a final recovery, but owing to non-union, formation of fistula and reoperation, was eventually in the same condition as those who are operated on according to the Gluck method with preliminary resection of the trachea. The author therefore prefers the Gluck operation to that of Foederl.

H. Werckmeister[1] has collected 297 cases of total extirpation of the larynx of which 36 were fatal. Gluck, out of 26 cases, had good results in 23.

Tumors. O. Chiari[2] has concluded from extensive histologic research that the nodules known as *"singers' nodes"* are the result of a circumscribed hypertrophy of the margin of the vocal cords, which occurs in consequence of protracted local irritation. If a gland or the orifice of a gland happens to be located at the spot—which, however, is seldom the case—it shares in the production of the nodule, but is not the essential cause of its formation, as some have assumed.

Cyst of the Vocal Cord. J. P. Clarke[3] reports a case. The patient complained of hoarseness and difficulty in speaking. Above the surface of the right vocal cord was an oval, smooth, grayish-white, pearly swelling. Under cocain an attempt was made to remove it with the Schrötter forceps, but it was so firm that the forceps slipped off. It was then incised with a concealed laryngeal knife, and a milky fluid exuded, after which the cyst disappeared. Microscopically the contents showed degenerated epithelial cells and a few leucocytes. Nine months later there was no difficulty in talking, and the voice was clear. There were two minute knobs of mucous membrane projecting from the free edge of the vocal cord.

Laryngocele. Pelletier[4] makes a contribution to the study of this subject. Laryngoceles are tumors filled with

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(1) Klin. therap. Woch., April 28, 1901.
(2) Archiv. f. Laryngol., XI, 3.
(3) Boston M. and S. Jour., Nov. 29, 1900.
(4) Bull. de Laryngol., etc., March 30, 1901.

air, lying in the larynx. They are divisible into two principal groups: 1. Laryngoceles unaccompanied by solution of continuity of the laryngeal walls. They are usually intralaryngeal, and are produced by a dilation of the normal or abnormal cavities lying in relation to the larynx. Of these there are two examples by Carrey, successfully treated by reposition and compression. Abnormal cavities of congenital origin give two types of laryngoceles. The first corresponds to the "ventricular laryngocele" of Virchow. It is due to the dilation of the prolongation of the ventricle of Morgagni. The tumor is then intralaryngeal, and situated behind the thyro-hyoid membrane. It is visible by laryngoscopic examination even without external manifestation and the cyst is little developed. The second corresponds to the description of Bennet and Gruber. The diverticula of the distended ventricles of Morgagni form two tumors, separated by a retracted portion. One is intralaryngeal, the other extralaryngeal and lies in front of the thyro-hyoid membrane. In short it is the intermediate type between laryngoceles without, and laryngoceles with solution of continuity of the laryngeal walls. The tumors are more or less rounded, without adherence to the skin. They are usually reducible by pressure. Functional troubles of the voice and especially respiration vary with the volume of the tumor. That it is which calls for surgical intervention. Compression is only a palliative means, without permanent action on the intralaryngeal tumor. We ought therefore to ablate both extra- and intralaryngeal tumors, which can be done by tracheotomy.

2. Laryngoceles resulting from a solution of continuity of the laryngeal wall. They are usually extralaryngeal. In one variety, theoretically possible, the solution of continuity would be incomplete. The laryngeal mucosa would be intact and would form a hernia through the solution of cartilaginous continuity. The existence of this variety has never been shown. In a second variety the solution of continuity is complete. It can be due to

a congenital lesion of the larynx, a traumatism or an ulceration of the larynx. For the laryngocele to be produced under such conditions it is necessary that the aponeuroses situated against the larynx be intact. These limit the walls of the pocket and prevent the air from passing from pocket to pocket in the cellular tissue of the neck. These laryngoceles form round and smooth tumors of variable size. They are adherent to the deeper parts, though the skin is movable on their surfaces. They are sonorous on percussion, their reducibility is inconstant, due without doubt to the narrowness of the laryngeal fissure. The treatment varies with the cause. In laryngoceles due to tuberculous ulceration of the larynx, it would be prudent to resort to palliative treatment, to avoid everything which aggravates the laryngocele and to exert moderate compression on the tumor.

Angioma. Seifert[1] says that angioma is one of the rarest of the benign tumors of the larynx. Fauvel has observed only 1 in 300 cases of benign tumors of the larynx, Jurasz 2 in 193, Schrötter and Moritz Schmidt each 1. Isolated cases have been published by Heinze, Elsberg, Kidd, Loonus, Wolfenden, Glasgow, Tanler, Pantaloni, Hamilton, Bond, Magnan, O. Chiari, Krieg, etc., but these were surely only angio-fibromata, or more correctly vascular fibromata. The cases of Bond, where there was a very bloody expectoration, or those of Loonus and Magnan, where there were at the same time angiomata upon the soft palate, the tonsils, the left side of the tongue, the left ventricular band and vocal cord, and those of Chiari and Krieg can be considered as true angiomata. In all these cases there is a cavernous tumor, very rarely a simple angioma, and very rarely, indeed, varices. The cavernous lymph-angioma was observed only once and the site was the aryepiglottic fold.

Siefert has met with only one case of tumorous varix of the larynx. It was in a man aged 50, who had very frequent hemorrhages. The tumor, which was upon the left vocal cord, was removed by means of a Schrötter's forceps. Angiomata develop very gradually. The cavernous are raspberry-like prominences of a deep red or bluish red color, sometimes almost black. They often act as true erectile tumors, their volume being increased by pressure (Krieg). The simple angioma most often appears as a level prominence, close examination of which shows it to be composed of a large number of fine blood vessels. The varix forms a bluish red nodule.

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[1] Rev. hebdom. de Laryng., etc., Jan. 12, 1901.

The false angiomata, especially the angio-fibromata, are less rare. In fifty-four cases of benign tumors of the larynx observed in the last nine-and-a-half-years, Seifert found eight angio-fibromata, of which seven were in men and one in a woman. The age of the patients ranged from 36 to 50 years. The tumors were situated three times on the right vocal cord, three times on the left vocal cord, and once at the anterior commissure. In the case shown in the Atlas of Seifert and Kahn, there was a tumor on each vocal cord. The angio-fibromata are tumors of the size of a lentil or pea, very rarely attaining that of a cherry, presenting usually a large base, only exceptionally possessing a pedicle more or less marked, and noticeable for their deep bluish red color and unequal, irregular surface. The vocal cords are the most frequent seat of the tumors, but they have also been observed on the ventricular bands, in the vestibule of Morgagni, at the anterior commissure and on the aryepiglottic fold. They are usually single, but sometimes multiple. The angio-fibromata as well as the true angiomata and simple fibromata, are more often observed in men than in women, and are often accompanied by hyperemia and chronic catarrh of the larynx.

Among the eight cases of angioma of the larynx which he observed, the following appeared especially interesting. It was in a man of 50 years, who had suffered for a year with pronounced hoarseness. Believing that it was a simple catarrh of the larynx the physicians he had consulted had him take the treatment at Reichenhall, etc., which had produced no alleviation. There had never been hematemesis. The examination of the larynx showed, in addition to a very pronounced inflammation of the organ, the presence on the anterior commissure of a tumor slightly larger than a pea, of a bluish red color and of aspect and form to justify the diagnosis of an angioma. Ablation performed by means of a Schrötter's forceps was a little difficult, since the surface of insertion of the tumor extended up to the sub-glottic space. The hemorrhage following the operation was very abundant, but was stopped at the end of ten minutes after the patient had eaten considerable ice. The voice became clear immediately after the operation, the cure was accomplished without any accident, and the patient actually possessed an absolutely normal voice. Microscopic examination showed that the tumor was composed of connective tissue with numerous cavernous spaces filled with blood. The connective tissue presented a peculiar fibrinous degeneration. The epithelium of the surface was transformed into horny layers, which gave to the edges of the tumor a white color that had been observed in the laryngoscopic examination.

Carcinoma. J. N. MacKenzie[1] strongly opposes the removal of a portion of a suspected carcinomatous laryngeal growth for the purpose of verifying the diagnosis, since when this is done there is always danger of auto-infection at the point of incision and of metastasis elsewhere. It also stimulates the local growth of the cancer and the information given by the microscope is often inconclusive and misleading. He is opposed to the endolaryngeal method of operating for cancer, and makes a plea for the early recognition of the growth by naked eye diagnosis and then an early attempt at radical removal, and regards thyrotomy as justifiable as a diagnostic measure in cases in which there is a reasonable degree of doubt. He does not consider any operation as of any lasting good that stops short of complete excision of the larynx and the neighboring lymphatics and glands. Any operation should

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(1) Jour. of Laryngol., Oct., 1900.

be done with the same degree of thoroughness that an operation for cancer is done in any other part of the body, and "in the hands of a skillful surgeon extirpation of the larynx is not the ghastly operation that we have been taught to regard it in the past, whilst its dangers are largely, if not wholly, preventable. Excision of the larynx and the removal of the neck lymphatics is one of the simplest and easiest dissections of major surgery, and the chief danger accompanying the former, septic pneumonia, may be perfectly done away with by low tracheotomy and packing between the tube and the upper wound. The chief danger is not from the operation, but from recurrence in the neck lymphatics. No operation for laryngeal cancer is complete without the removal of the neck lymphatics."

The history of the treatment of laryngeal cancer up to the present time has been discouraging because the disease has been only partly removed. Favorable statistics and prognosis in cancer of the larynx will not appear until the surgeon removes not only the entire organ, but also the neighboring lymphatic area, nor can the conscientious surgeon consider that he has done his whole duty to his patient and himself unless he has done this.

TRACHEA.

Tracheotomy.—J. Rogers, Jr.,[1] reports a series of cases of which four were laryngotomies, and ten tracheotomies, without a death which could be ascribed to the operation. Cocain should be used when the patient is controllable, but children, or patients who cannot be kept quiet require chloroform, and in no instance did it cause trouble. Most of these patients suffered division of the cricoid cartilage, and experience seems to demonstrate that such an operation, if the canula has to be worn for any length of time, invariably leads to bad cicatricial contraction, which can be cured only by prolonged intubation. It can, however,

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(1) N. Y. Med. Record, April 27, 1901.

be permanently overcome in every instance. Laryngotomy, except for tumor, is useless. The high opening of the respiratory passages, on the other hand, has some distinct elements of safety in its performance. A low tracheotomy presents only the doubtful advantage of a less probability of subsequent stricture above a long retained canula. If the stenosis is not chronic, and there is hope of a speedy cure by a simple tracheotomy and the wearing of a canula a few weeks, and also if a careful dissection is possible, the low operation is preferable. In general, and especially for emergencies and chronic stenosis, which must subsequently be treated by intubation, the high operation is safer and better than the low. Granulations, as a complication, were not encountered in any of the cases reported, and in several of them the canula was worn for a long period. Granulations develop at the upper angle of a tracheotomy wound, but do not in themselves give trouble. They are merely a prelude to the subsequent cicatrix which draws the trachea together in a dome-shaped pouch above the canula, and this contraction seems to be worse, the nearer the wound is to the vocal cords.

Resection of the trachea is advocated by O. Frankenberger.[1] He reports a case of strumous stenosis in a girl of sixteen from Maixner's clinic. Tracheotomy was performed, entirely relieving the dyspnea and threatened asphyxia. The tube was removed on the eighth day and recovery was complete. The stenosis recurred nine months later, however, but was relieved by catheterization. The author advances the claim that the only radical treatment of stenoses of strumous origin, and all chronic stenoses which include only a limited portion of the treachea, is in removal of the stenosed part, *i. e.*, resection. He cites the cases of Küster, one of laceration of the trachea resulting in stenosis on cicatrization, the other a severing of the wind-pipe in attempted suicide, one end growing into the skin. In both of these cases resection was success-

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(1) Ann. des Mal. de l'Or., etc., May, 1901.

fully performed. The experiments of Colley, Gluck and Zeller on dogs are cited. The author reports his experiments with seven dogs on which he practiced resection of the trachea, and describes the technic employed. Although two of his dogs died of pneumonia, the results in the others were so favorable as to commend the operation in human practice, the conditions of asepsis, etc., being better in the human being.

BRONCHI.

Ricard[1] operated in a case in which a canula had fallen into the right bronchus, by opening up the anterior mediastinum. The incision started at the left sterno-clavicular articulation and passed across to the other. It was then carried perpendicularly to the third rib and then horizontally across the sternum to the left side. The clavicle was disarticulated, and a chondro-sternal flap turned back, without the slightest hemorrhage. The pleural sac was drawn out of the way and the trachea and right bronchus were thus easily exposed, but the left bronchus was not visible.

Fired[2] reports a case of foreign body in a secondary bronchus. A boy had inspired a rounded lead button, about 8 mm. in diameter. Several months later the foreign body was removed from the site of lodgment at the bifurcation of a bronchus of the second dimension by von Schrötter, by means of a Killian's tube inserted under cocain through the natural passages, the forceps being manipulated under guidance of the eye.

ESOPHAGUS.

Bourneville[3] reports two cases of sudden, repeated hematemesis in two epileptic idiotic children, rapidly fatal.

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(1) Progrès médical, March 30, 1901.
(2) Ungar. Mediz. Presse, Nos. 33, 34, 35.
(3) Progrès médical, June 29, 1901.

There were no functional disturbances; the children did not complain of pain and the cause of the hematemesis was unknown until the autopsy disclosed in each case a fragment of bone impacted in the upper portion of the esophagus, with ulceration and perforation into the pharynx in one case in which the bone had lodged behind the cricoid cartilage. He emphasizes the importance of strict oversight of the food of idiots in order to prevent such accidents, and the selection of suitable articles of food for them.

ANESTHETICS.

In regard to the anesthetic for operations on nose and throat, F. E. Hopkins[1] is in the habit of using ether. Not having a trained anesthetist at his command, he always asks the physician sending him the patient to give the ether. In a number of cases conditions have arisen which for a time seemed alarming, because of collapse due to the anesthetic, yet there always seemed something to work on and the patient was always restored. If rectal etherization could be used, it would be a great convenience in operations on the nose and throat. Buxton has followed this method extensively, and says that it affords superior facilities and freedom to the operator, less ether is used, recovery is more rapid, after-effects are less severe and the stage of excitement is lessened or abrogated. The disadvantage is the greater length of time it requires. He has succeeded in three minutes and has had to wait for fifteen or thirty in other cases. Bennett, Miller, Brown and Kelly pronounce nitrous oxid almost an ideal agent for production of anesthesia, though not for its maintenance. It is pleasant to inhale, rapid in action, free from irritating or stimulating effects and is the safest anesthetic known. Used to precede ether, a form of anesthesia is obtained which is exceedingly satisfactory. The patient at the beginning is spared any knowledge of ether used,

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(1) **Boston M. and S. Jour., Sept. 12, 1901.**

none being administered until unconsciousness is induced by the gas. There is no coughing, no choking, no stage of excitement and little or no mucus. When ether is begun it can be pushed to complete anesthesia in two or three minutes. Miller reports 160 cases in which no one has been conscious when the change was made, or has experienced anything disagreeable from the anesthetic. Brown and Kelly report that after over 200 anesthetizations with this method, their faith in it has increased a hundredfold. They use Bennett's inhaler and follow his method. Buxton recommends nitrous oxid for all brief operations both in dentistry and general surgery. In all conditions in which any respiratory difficulty exists, as in cyanosis and in asthenic states, it is well to give it in combination with oxygen, but when for any reason that method is impracticable, nitrous oxid with air gives in skilled hands nearly as good results. He considers ether the best and safest anesthetic, either alone or preceded by nitrous oxid, both for children and for adults, and states that it should be adopted as the routine practice.

As a *general anesthetic in adenoid operations,* J. W. Gleitsman[1] uses ethyl bromid almost exclusively. He prefers Merck's preparation and administers a sufficient quantity with an impermeable mask to produce complete narcosis—generally less than 30 grams being necessary. The bromid is given to the child held in the upright position. He instructs his assistants to lower the head of the child quickly after removal of the instrument to allow the outflow of blood.

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(1) Laryngoscope, July, 1901.

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